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OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1979

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Robert G. Piotrowski**

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist**

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OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1979

Compiled by
Robert G. Piotrowski

ABSTRACT

Oil production in 1979 totaled 2,816,682 barrels, 3,060 barrels below the 2,819,742 barrels produced in 1978. Oil reserves increased from 48,156,000 barrels in 1978 to 50,845,000 barrels in 1979, a 6 percent increase. Leading counties for oil production were McKean, Venango, and Warren; these also have the largest reserves. In 1979, secondary waterflood production in the Bradford field accounted for 56 percent of the statewide oil production. Two new waterflood projects were begun during the year: the Highland Warrant project in the Sackett field, Elk County, and the Tally Ho project in the Guffey field, McKean County. Two old tertiary projects remained active, the Penn Grade Micellar Displacement project at Derrick City and the experimental Maraflood project at Cyclone. A third tertiary project was begun adjacent to the Maraflood project at Cyclone. All of these tertiary projects are in the Bradford field.

Gas production decreased to 96,313 million cubic feet in 1979 from 97,763 million cubic feet in 1978, a 1.5 percent decrease. Gas reserves, including stored recoverable gas, increased from 2,093,516 million cubic feet in 1978 to 2,251,312 million cubic feet in 1979, up 7.5 percent.

The price of Penn Grade Crude oil ranged from \$14.77 per barrel at the beginning of 1979 to \$38.00 per barrel by year's end. This was an increase of 157 percent. The wellhead price paid per thousand cubic feet for natural gas during the year ranged from \$0.30 per thousand cubic feet under old contracts to as high as \$2.60 per thousand cubic feet for stripper gas. The maximum price paid for new gas was \$2.17. Ceiling prices for natural gas are set by the Natural Gas Policy Act.

The total number of wells completed in Pennsylvania in 1979 was 1,941, an increase of 193 wells (11 percent) over 1978. Total footage drilled was 4,832,383, an increase of 5 percent over 1978 (4,581,717 feet). In 1979, 757 oil wells were completed. This is an increase of 200 wells or 36 percent compared to 1978. The three most active counties in oil well drilling were Venango, Warren, and Forest, where approximately 99 percent of all oil wells were drilled. There was also a large increase in oil-related service wells during the year. A total of 1,043 gas wells were completed in 1979, which is a decrease of 62 wells or 6 percent over 1978. The five most active counties in gas well drilling were Indiana, Jef-

ferson, Erie, Westmoreland, and Armstrong, where approximately 8 percent of all gas wells were drilled.

Exploratory wells drilled to find and produce hydrocarbons in unproved areas decreased from 97 wells, comprising 378,486 feet of hole, in 1978 to 69 wells, comprising 286,410 feet of hole, in 1979, a decrease of 28 percent in wells and 24 percent in footage. There were 22 gas discoveries and 1 oil discovery in 1979.

Seismic exploration activity decreased slightly from 30.95 crew-months in 1978 to 29.78 crew-months in 1979. Seismic crews operated in 13 counties in Pennsylvania during the year.

INTRODUCTION

Pennsylvania oil and gas statistics reported here are based on drillers' records and location plats filed with the Oil and Gas Regulatory Division of the Bureau of Topographic and Geologic Survey, the administrative and regulatory agency for the oil and gas laws. Only those wells are reported for which records and plats have been received within the year. This includes wells drilled in prior years for which records were submitted and received in 1979. It does not include 1979 wells for which records had not been submitted within the year. Oil production and reserves data and gas production and reserves data shown in Figures 1 through 7 were obtained from the American Petroleum Institute and the American Gas Association, respectively.

ACKNOWLEDGEMENTS

We appreciate the cooperation of the Oil and Gas Regulatory Division of the Bureau of Topographic and Geologic Survey, Pennsylvania Department of Environmental Resources, in sharing drillers' logs submitted to them by the operators under the oil and gas law.

We also appreciate the help of the Pennsylvania Game Commission, the American Gas Association, the American Petroleum Institute, Petroleum Information Corporation, Pittsburgh Oil Scouts Association, the Division of Minerals of the Bureau of Forestry, Pennsylvania Department of Environmental Resources, and the Bureau of Statistics, Pennsylvania Department of Commerce.

Thanks are extended to all operators and companies who released natural gas production statistics and other data.

Cheryl L. Cozart of the Oil and Gas Geology Division, Bureau of Topographic and Geologic Survey, assisted in the compilation of this report.

PRODUCTION AND RESERVES

OIL PRODUCTION

In 1979, a total of 2,816,682 barrels (bbl) of oil was produced from Upper Devonian and Silurian sandstones, compared to 2,819,742 bbl of oil in 1978. Included in that total is the production of crude oil formerly designated as "Corning Grade" from Medina (Lower Silurian) sandstones in Erie and Crawford Counties, amounting to 70,440 bbl, up 8,824 bbl from 1978. All oil produced in Pennsylvania is now designated Penn Grade Crude. Production of natural gas liquids decreased 15 percent in 1979 (Figure 1).

Figure 1. Oil production in Pennsylvania, 1979

	1979	1978	% Change	Cumulative to 12/31/79
	(1,000 barrels)			
Penn Grade	2,817	2,820	0	1,297,755
Natural gas liquids	57	67	- 15	

Figure 2 shows the amount of oil production and total number of producing wells by county. The total oil production in the two figures differs because Figure 1 is based on actual oil produced whereas Figure 2 is based on oil shipped or sold. The leading counties for oil production in 1979 were McKean, Venango, and Warren Counties, which together produced approximately 79 percent of the total oil produced in Pennsylvania.

DEVELOPED OIL RESERVES

Total developed reserves of oil in the Commonwealth at the end of 1979 increased 6 percent from 1978. The counties that had the greatest reserves were McKean, Venango, and Warren. New reserves were added in McKean and Elk Counties. Reserves of natural gas liquids fell 18 percent. Figure 3 summarizes proved reserves in 1979 and 1978.

SECONDARY AND TERTIARY OIL RECOVERY PROJECTS

Eighty-four service wells were drilled in 1979 compared to 21 in 1978 and only 8 in 1977. This included 1 gas-storage observation well in Potter County, and 83 water- or gas-injection wells; 59 wells in McKean County, 20

Figure 2. Oil wells and crude oil produced in Pennsylvania in 1978 and 1979, by counties*

County	Crude oil production (barrels)		Number of producing oil wells	
	1979	1978	12/31/79	12/31/78
Allegheny	63,515	50,093	340	287
Armstrong	8,886	8,731	72	72
Beaver	5,063	4,940	102	102
Butler	67,703	67,736**	1,201	1,210
Clarion	25,705	25,574	520	495
Clinton	0	52	0	1
Crawford	67,066	59,125	75	71
Elk	15,884	19,134	230	197
Erie	3,373	1,131	29	14
Fayette	0	0	1	1
Forest	114,220	109,771	975	1,187
Greene	26,787	24,113	290	301
Indiana	2,037	521	14	2
Jefferson	5,130	3,191	29	29
Lawrence	37	0	1	0
McKean	942,031	1,065,339	12,247	12,442
Mercer	994	994	47	86
Potter	13,334	14,461	80	80
Venango	590,124	550,197	6,845	6,879
Warren	564,028	473,421	4,213	3,757
Washington	128,123	85,963	607	555
Westmoreland	365	0	7	0
Total	2,644,405	2,564,487**	27,925	27,768

* Compiled by the Pennsylvania Department of Commerce, Bureau of Statistics

** Revised figures

Figure 3. Oil reserves in Pennsylvania, 1979

	1979	1978	% Change
	(1,000 barrels)		
Total oil	50,845	48,156	+ 6
Natural gas liquids	266	323	− 18

wells in Forest County, 2 wells in Potter County, and 2 wells in Elk County. This is a large increase in oil-related service wells during the year.

Figure 4 shows how much of Pennsylvania's previous production was due to secondary recovery and that the Bradford field in McKean County accounted for the majority. In 1979, 47 new water-injection wells were drilled in the Bradford field, and waterflood production in the field was 56 percent of the total statewide production.

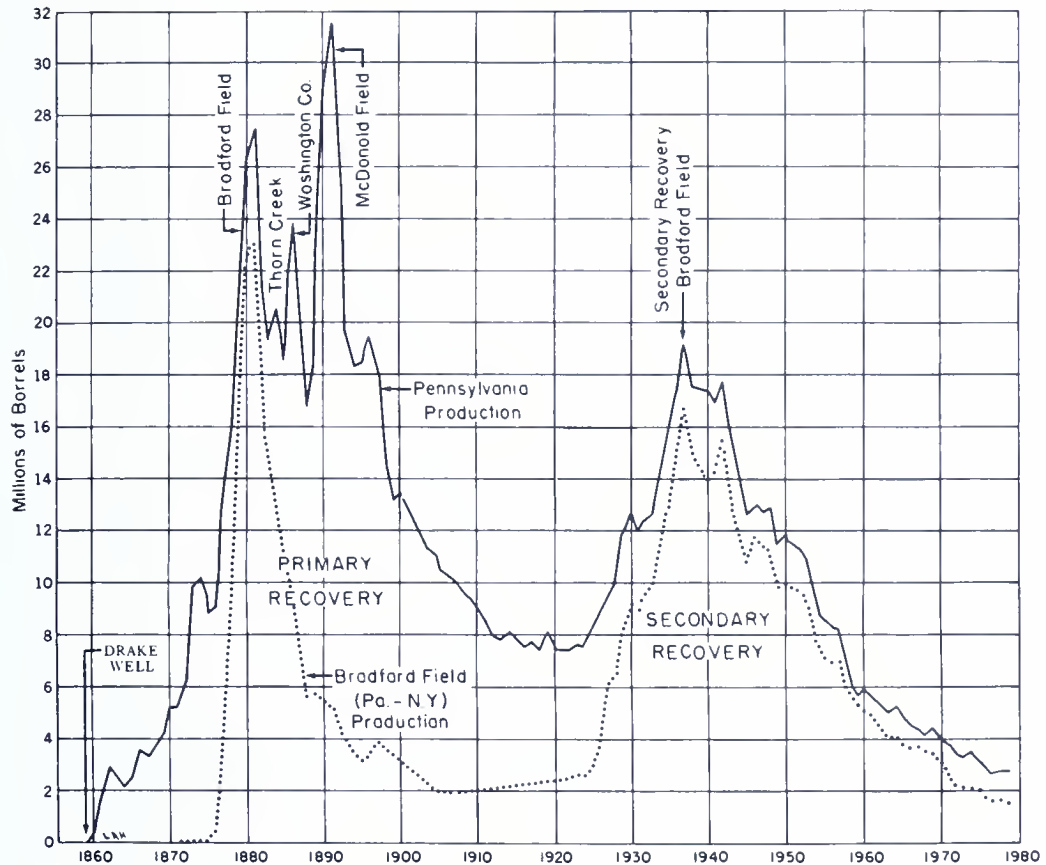


Figure 4. Annual production of crude oil in Pennsylvania

Two new waterflood projects were undertaken in 1979. The Highland Warrant waterflood project operated by Pennzoil is located in the Sackett field, Elk County. The reservoir is the Kane Sand. The second project is the Tally Ho waterflood project operated by Witco. It is located in the Guffey field, McKean County, and the Bradford Third Sand is the reservoir. The most active secondary recovery project during 1979 was the Bingham Lease waterflood operated by Pennzoil in the Bradford field, McKean County. Thirty-eight water-injection wells were completed in the project during the year.

The Penn Grade Micellar Displacement Project at Derrick City, a joint effort of Pennzoil, Witco, Quaker State, and the U. S. Department of Energy for tertiary oil recovery from the Bradford field, is reported to be progressing satisfactorily. Injection of the micellar solution continued through 1979. The project consists of 24 acres, within which are 16 input and 25 producing wells on 1.5-acre spacing; the reservoir is the Bradford Third Sand. The experimental Maraflood project in the tight Bradford Sandstone in the Bradford field at Cyclone (Project #7), jointly sponsored by Pennzoil and Witco, is in a late stage, and water injection is continuing.

A third tertiary recovery project was reported begun adjacent to Project # in late 1979. This project is also in the Bradford Sandstone in the Bradford field.

GAS PRODUCTION

Gas production in 1979 decreased 1.5 percent from 1978, totaling 96,313 million cubic feet as compared to 97,763 million cubic feet in 1978. The number of producing gas wells increased to approximately 19,800 at the end of 1979 from approximately 18,900 producing wells at the end of 1978. Figure 5 gives an overview of gas production for 1979, compared to 1978.

Figure 5. Gas production in Pennsylvania, 1979

	1979	1978	% Change	Cumulative to 12/31/79
	(millions of cubic feet)			
Shallow gas ¹	83,787	84,485	- 1	—
Deep gas ²	12,526	13,278	- 6	—
Total gas	96,313	97,763	- 1	9,299,929

¹ Shallow gas: from Late Devonian or younger rocks; generally less than 4,000 feet deep.
² Deep gas: from Middle Devonian or older rocks; generally more than 4,000 feet deep.

GAS RESERVES

The total proved recoverable reserve of natural gas rose 7.5 percent over 1978, and stored recoverable gas rose 9 percent (Figure 6). Figure 7 is a graph showing production, consumption, and reserves of natural gas in Pennsylvania.

Figure 6. Gas reserves in Pennsylvania, 1979

	1979	1978	% Change
	(millions of cubic feet)		
Total gas	2,251,312*	2,093,516*	+ 8
Stored recoverable gas	633,494	582,260	+ 9

* Includes stored recoverable gas

GAS STORAGE FIELDS

Gas storage fields have been created throughout Pennsylvania to accumulate gas during low-demand periods for use during high-demand periods. Storage capacity at the end of 1979 was 757,610,049 thousand cubic feet an increase of 115,610,408 thousand cubic feet from 1978. Recoverable gas



Figure 7. Production, consumption, and reserves of natural gas in Pennsylvania

in storage in 1979 was 633,494,000 thousand cubic feet compared to 582,260,406 thousand cubic feet in 1978. Figure 8 is a map showing the locations and names of all active gas storage fields in Pennsylvania.



Figure 8. Active gas storage fields of Pennsylvania
NAMES OF ACTIVE GAS STORAGE FIELDS IN PENNSYLVANIA

ALLEGHENY COUNTY

1. Bunala
2. Gamble Hayden
3. Tepe
4. Murrysville
5. Mt. Royal
6. Smith Parke

ARMSTRONG COUNTY

7. Fair and Helm
8. South Bend
- BEAVER COUNTY**
9. Black Hawk
- BEDFORD COUNTY**
10. Five Forks

BEDFORD COUNTY (cant.)

11. Artemas
- BUTLER COUNTY**
12. Vardy
13. Partman
14. Hughes

NAME OF ACTIVE GAS STORAGE FIELDS IN PENNSYLVANIA (*Continued*)

CAMBRIA COUNTY	GREENE COUNTY (cont.)	POTTER COUNTY (cont.)
15. Rager Mountain	31. Hunters Cave	49. Hebron
CLARION COUNTY	32. Holbrook	50. Ellisburg
16. Truittsburg	33. Pratt	51. Harrison
CLEARFIELD COUNTY	INDIANA COUNTY	52. Wharton
17. Gourley-Miller	34. Alabran	53. Greenlick
CLINTON COUNTY	35. Kinter	TIOGA COUNTY
18. Leidy	36. Clark	54. Sabinsville
19. Tamarack-Downs	37. Schmidt	55. West End Tioga
ELK COUNTY	JEFFERSON COUNTY	56. Tioga
20. St. Marys	38. Sprankle	57. Meeker
21. Boone Mountain	39. Galbraith	WARREN COUNTY
22. Owls Nest	40. Markle	58. Deerlick
23. Belmouth	41. Munderf	59. East Branch "A"
ERIE COUNTY	McKEAN COUNTY	WASHINGTON COUNTY
24. Meade	42. Meade Run	60. Donegal
25. Corry	43. Keelor	61. Colvin
FOREST COUNTY	44. Swede Hill	62. Finleyville
26. Queen	45. Wellendorf	WESTMORELAND COUNTY
27. Duhring	46. East Branch "B"	63. Seanor
GREENE COUNTY	MERCER COUNTY	64. Oakford
28. Majorsville-Heard	47. Henderson	65. Webster
29. Swarts West	POTTER COUNTY	66. Patton
30. Swarts	48. Sharon	

OIL AND GAS PRICES

Practically all oil production in Pennsylvania is classified as stripper production (less than 10 barrels per well per day). The stripper price for Penn Grade was \$14.77 per barrel on January 1, 1979, and rose 157 percent to \$38.00 per barrel by year's end (Figure 9).

All natural gas prices in 1979 were subject to the Natural Gas Policy Act (N.G.P.A.), which was signed by President Carter on November 9, 1978. It

Figure 9. Stripper oil prices in Pennsylvania, 1979

<i>Month</i>	<i>Price per barrel</i>
January 1, 1979	\$14.77
May 1, 1979	15.50
June 13, 1979	23.00
July 26, 1979	25.00
August 1, 1979	28.50
October 1, 1979	32.50
November 1, 1979	35.00
December 1, 1979	37.00
December 31, 1979	38.00

is a comprehensive revision of the national policy concerning natural gas pricing and regulation. The Act is a gradual move toward price deregulation of newly discovered natural gas by 1985 with specific price increases for all categories of natural gas in the interim. Further, intrastate gas is put under federal price controls for the first time.

The N.G.P.A. divides gas-pricing categories into two broad groupings: (1) gas under interstate contracts when the act was passed, and (2) gas not under contract at that time (Figure 10).

Pricing of gas under interstate contracts when the N.G.P.A. was passed remains set at the "just and reasonable" rates established by the Federal Energy Regulatory Commission or its predecessor, the Federal Power Commission.

Producers can collect prices up to ceilings set by the N.G.P.A. for gas not under interstate contract when the Act was passed. These prices are maximum prices and a lower price is allowable depending upon the supply-and-demand situation. Producers are required to apply to state agencies for determinations that gas qualifies for pricing under one of four categories. In Pennsylvania, this agency is the Division of Oil and Gas Regulation (N.G.P.A. Section) of the Bureau of Topographic and Geologic Survey in the Department of Environmental Resources. State agency determinations are subject to review by the Federal Energy Regulatory Commission. Applications for pricing determinations must be made on a well-by-well basis and the burden of proof for eligibility of price lies upon the producer.

The actual wellhead price paid per thousand cubic feet for natural gas during the year ranged from \$0.30 in old contracts to as high as \$2.60 per thousand cubic feet for stripper gas. The maximum price paid for new gas was \$2.17.

DRILLING AND COMPLETIONS COSTS

The costs of drilling and completing wells are conventionally given in dollars per foot. These costs vary with depth of drilling and method of completion. The costs generally increase very rapidly as wells penetrate below the usual drilling depths in a given area. A dry hole will normally be far cheaper than a completed producing well of the same depth because there are no completion costs. An "ultra deep" exploratory well will commonly be extremely expensive in terms of costs per foot due to provisions for problems not usually encountered in shallower holes or in areas of well-understood subsurface geology. In Pennsylvania, where shallow drilling is the rule (average depth per well in 1979 was 2,490 feet), a well below 5,000 feet is considered moderately deep, and below 9,000 feet ultra deep.

Due to widely varying conditions, even in the same area, and inflationary

Figure 10. Gas price ceilings under Natural Gas Policy Act of 1979*

Subpart of part 2/1	N.G.P.A. Section	Category of gas	Maximum lawful price for deliveries made in:												
			Jan. 1979	Feb. 1979	Mar. 1979	Apr. 1979	May 1979	June 1979	July 1979	Aug. 1979	Sept. 1979	Oct. 1979	Nov. 1979	Dec. 1979	Jan. 1980
			cost per million British Thermal Units												
B	102	New Natural Gas, Certain OCS Gas	\$2,096	\$2,116	\$2,136	\$2,156	\$2,177	\$2,198	\$2,220	\$2,244	\$2,268	\$2,292	\$2,314	\$2,336	\$2,358
C	103	New Onshore Production Wells	1,980	1,993	2,006	2,019	2,033	2,047	2,062	2,079	2,096	2,113	2,128	2,143	2,158
F	106 (b) (1) (B)	Alternative Maximum Lawful Price for Certain Intrastate Rollover Gas	1,128	1,136	1,144	1,152	1,160	1,168	1,176	1,185	1,195	1,205	1,213	1,221	1,229
G	107	High Cost Gas (below 15,000 only)	2,096	2,116	2,136	2,156	2,177	2,198	2,220	2,244	2,268	2,292	2,314	2,336	2,358
H	108	Stripper Gas	2,243	2,264	2,285	2,306	2,329	2,352	2,375	2,400	2,426	2,452	2,475	2,499	2,523
I	109	Not Otherwise Covered	1,639	1,650	1,661	1,672	1,684	1,696	1,708	1,722	1,736	1,750	1,762	1,774	1,786

* Prices reflect monthly adjustments for inflation and real growth factors in categories where such adjustments apply.

increases in cost of such items as steel well casing, only very approximate cost estimates can be given.

1. Venango County, shallow oil well, about 900 feet deep. Dry hole,* about \$9 per foot. Completion, about \$25-\$27 per foot.
2. McKean County, shallow oil well, about 1,800-2,000 feet deep. Dry hole,* about \$9 per foot. Completion, about \$27 per foot.
3. Indiana County, shallow gas well, about 4,000 feet deep. Dry hole,* about \$10 per foot. Completion, about \$32-\$35 per foot.
4. Jefferson-Indiana-Clearfield Counties, deep "Oriskany" gas well, about 7,500 feet deep. Dry hole,* about \$15-\$16 per foot. Completion about \$25-\$30 per foot.
5. Somerset County, deep "Oriskany" gas well, about 9,000 feet deep. Completion, about \$39 per foot.
6. Crawford County, deep gas well producing from Lower Silurian, about 5,000 feet deep. Dry hole,* about \$13-\$14 per foot. Completion, about \$28-\$29 per foot.
7. Centre County, "ultra deep" wildcat, about 11,000 feet deep. Completion, about \$125-\$200 per foot.

* No attempt at completion.

1979 DRILLING AND COMPLETIONS

TOTAL COMPLETIONS

The total number of all wells completed in Pennsylvania in 1979 was 1,941 wells, including 31 wells drilled deeper. This is an increase of 193 wells (11 percent) over 1978. The total footage drilled was 4,832,383 feet, an increase of 250,666 feet (5 percent) over 1978. The average depth per well was 2,490 feet. The seven most active counties, in order of importance, were Indiana, Venango, Warren, Forest, McKean, Jefferson, and Erie, where approximately 80 percent of all wells were drilled (Figure 11).

OIL COMPLETIONS

The total number of oil wells completed in Pennsylvania in 1979 was 757 wells, including 1 well drilled deeper. This is an increase of 200 wells (36 percent) over 1978. The total footage drilled was 801,827 feet, an increase of 222,047 feet (38 percent) over 1978. The average depth per well was 1,059 feet. The four most active counties, in order of importance, were Venango, Warren, Forest, and McKean, where approximately 99 percent of all oil wells were drilled (Figure 12).

Figure 11. New well completions and old wells
drilled deeper in Pennsylvania, 1979

NEW WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Allegheny	3	3,352
Armstrong	84	3,530
Bedford	3	6,788
Butler	1	2,754
Cambria	6	3,747
Clarion	18	2,262
Clearfield	55	3,588
Crawford	18	4,041
Elk	4	2,532
Erie	136	3,342
Fayette	7	4,153
Forest	171	1,081
Greene	2	2,384
Indiana	404	3,727
Jefferson	143	3,402
McKean	169	1,908
Mercer	6	2,231
Potter	6	2,324
Somerset	8	8,886
Tioga	1	5,138
Venango	312	853
Warren	200	1,045
Washington	26	3,343
Westmoreland	127	3,820
Total	1,910	2,519

OLD WELLS DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average amt. deepened (feet)</i>
Armstrong	1	1,537
Butler	1	907
Clarion	1	334
Clearfield	1	7
Elk	1	376
Indiana	19	552
Jefferson	2	83
McKean	1	476
Washington	1	1,865
Westmoreland	3	1,497
Total	31	666

Figure 12. New oil well completions and old wells drilled deeper in Pennsylvania, 1979
NEW OIL WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average initial production (bopd)*</i>	<i>Average total depth (feet)</i>
Clarion.	2	1	1,063
Crawford.	1	4	606
Forest.	144	12	1,042
McKean.	103	4	1,860
Potter.	1	not given	1,440
Venango.	307	16	816
Warren.	196	19	1,021
Washington.	2	337	2,348
Total.	756	15	1,060

OLD OIL WELL DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average initial production (bopd)*</i>	<i>Average amount deepened (feet)</i>
McKean.	1	3	476

* bopd = barrels of oil per day

GAS COMPLETIONS

The total number of gas wells completed in Pennsylvania in 1979 was 1,043 wells, including 29 wells drilled deeper. This is a decrease of 62 wells (6 percent) over 1978. The total footage drilled was 3,687,025 feet, a decrease of 107,486 feet (3 percent) over 1978. The average depth per gas well was 3,535 feet. The five most active counties, in order of importance, were Indiana, Jefferson, Erie, Westmoreland, and Armstrong, where approximately 86 percent of all gas wells were drilled (Figure 13).

Figure 13. New gas well completions and old wells drilled deeper in Pennsylvania, 1979
NEW GAS WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcf/gpd)*</i>	<i>Average total depth (feet)</i>
Allegheny.	3	78	3,352
Armstrong.	83	411	3,530
Butler.	1	20	2,754

Figure 13. (Continued)
NEW GAS WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcfgpd)*</i>	<i>Average total depth (feet)</i>
Cambria	6	313	3,747
Clarion	15	157	2,085
Clearfield	52	639	3,553
Crawford	15	2,161	4,742
Erie	130	1,173	3,358
Fayette	6	162	4,168
Forest	4	91	1,701
Indiana	400	790	3,742
Jefferson	139	525	3,411
McKean	5	136	1,656
Mercer	5	664	2,603
Potter	2	13	1,523
Somerset	6	1,742	8,985
Venango	2	48	3,808
Warren	1	1,100	4,620
Washington	23	207	3,453
Westmoreland	116	694	3,820
Total	1,014	738	3,617

OLD GAS WELLS DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcfgpd)*</i>	<i>Average amount deepened (feet)</i>
Armstrong	1	683	1,537
Clarion	1	1	334
Clearfield	1	134	7
Elk	1	5	376
Indiana	19	1,179	552
Jefferson	2	193	83
Washington	1	93	1,865
Westmoreland	3	958	1,497
Total	29	916	664

* Mcfgpd = thousand cubic feet of gas per day

COMBINATION OIL AND GAS WELL COMPLETIONS
(not reported separately as oil or gas)

This classification refers to those wells that are primarily oil wells but that also produce 100 thousand or more cubic feet of gas per day. Because most oil wells completed in Pennsylvania are drilled in partially depleted reser-

voirs, most produce only very small amounts of gas with the oil. Therefore, this category includes only a small number of wells. In 1979, 6 oil-and-gas wells were completed, whereas in 1978, 15 such wells were completed (Figure 14).

Figure 14. New combination oil and gas well completions in Pennsylvania, 1979

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcfgpd)*</i>	<i>Average initial production (bopd)**</i>	<i>Average total depth (feet)</i>
Erie	1	800	4	2,655
Forest.	1	100	3	1,800
Warren.	3	108	9	1,416
Westmoreland	1	473	1	4,291
Total	6	283	6	2,166

* Mcfgpd = thousand cubic feet of gas per day

** bopd = barrels of oil per day

DRY COMPLETIONS

The total number of dry holes drilled in Pennsylvania in 1979 was 51, including 1 old well drilled deeper and completed dry. This compares to 50 dry-hole completions in 1978, including 1 old well drilled deeper and completed dry. The comparative footages are 179,858 in 1979 and 148,760 in 1978. Figure 15 shows the number of dry holes drilled and deepened in 1979.

MISCELLANEOUS COMPLETIONS

Comprised under this heading are stratigraphic or core tests, which are holes drilled basically for subsurface information; water-input wells for secondary recovery by waterflood operations; air- or gas-injection wells for secondary oil recovery by air or gas drive; water-supply wells for waterfloods; liquid-waste-disposal wells; and gas-storage observation wells. Fluctuations in this category are usually not significant as an indicator of general activity. However, in 1979, 84 miscellaneous wells were completed, compared to 21 in 1978 and only 8 in 1977. This total included 1 gas-storage observation well and 83 water- or air-injection wells for secondary oil recovery operations. This is a large increase in oil-related service wells during the year (Figure 16).

Figure 15. New dry-hole completions and old wells drilled deeper but completed dry in Pennsylvania, 1979

NEW DRY-HOLE COMPLETIONS

<i>County</i>	<i>No. of dry holes</i>	<i>Average total depth (feet)</i>
Armstrong.....	1	3,550
Bedford.....	3	6,788
Clarion.....	1	7,316
Clearfield.....	3	4,188
Crawford.....	2	502
Elk.....	2	2,724
Erie.....	5	3,067
Fayette.....	1	4,060
Forest.....	2	4,323
Greene.....	2	2,384
Indiana.....	4	2,220
Jefferson.....	4	3,074
McKean.....	2	1,755
Mercer.....	1	373
Somerset.....	2	8,586
Tioga.....	1	5,138
Venango.....	3	2,633
Washington.....	1	2,802
Westmoreland.....	10	3,783
Total.....	50	3,579

OLD WELL DRILLED DEEPER, COMPLETED DRY

<i>County</i>	<i>No. of wells</i>	<i>Average amt. deepened (feet)</i>
Butler.....	1	907

Figure 16. Service well completions in Pennsylvania, 1979

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Elk.....	2	2,341
Forest.....	20	875
McKean.....	59	2,018
Potter.....	3	3,153
Total.....	84	1,794

DRILLING AND PRODUCTION ACTIVITY (classified as shallow or deep)

Drilling and production in Pennsylvania is classified by the Pennsylvania Geological Survey as follows: (1) shallow, based on reservoirs in rock formations of Pennsylvanian, Mississippian, and Late Devonian age, generally less than 4,000 feet deep, and (2) deep reservoirs, which are in rock formations of Middle Devonian or older age, generally over 4,000 feet deep.

The shallow reservoirs generally produce both oil and gas; the deep almost entirely gas. Figure 17 is a graph showing the shallow-well activity from 1950-1979.

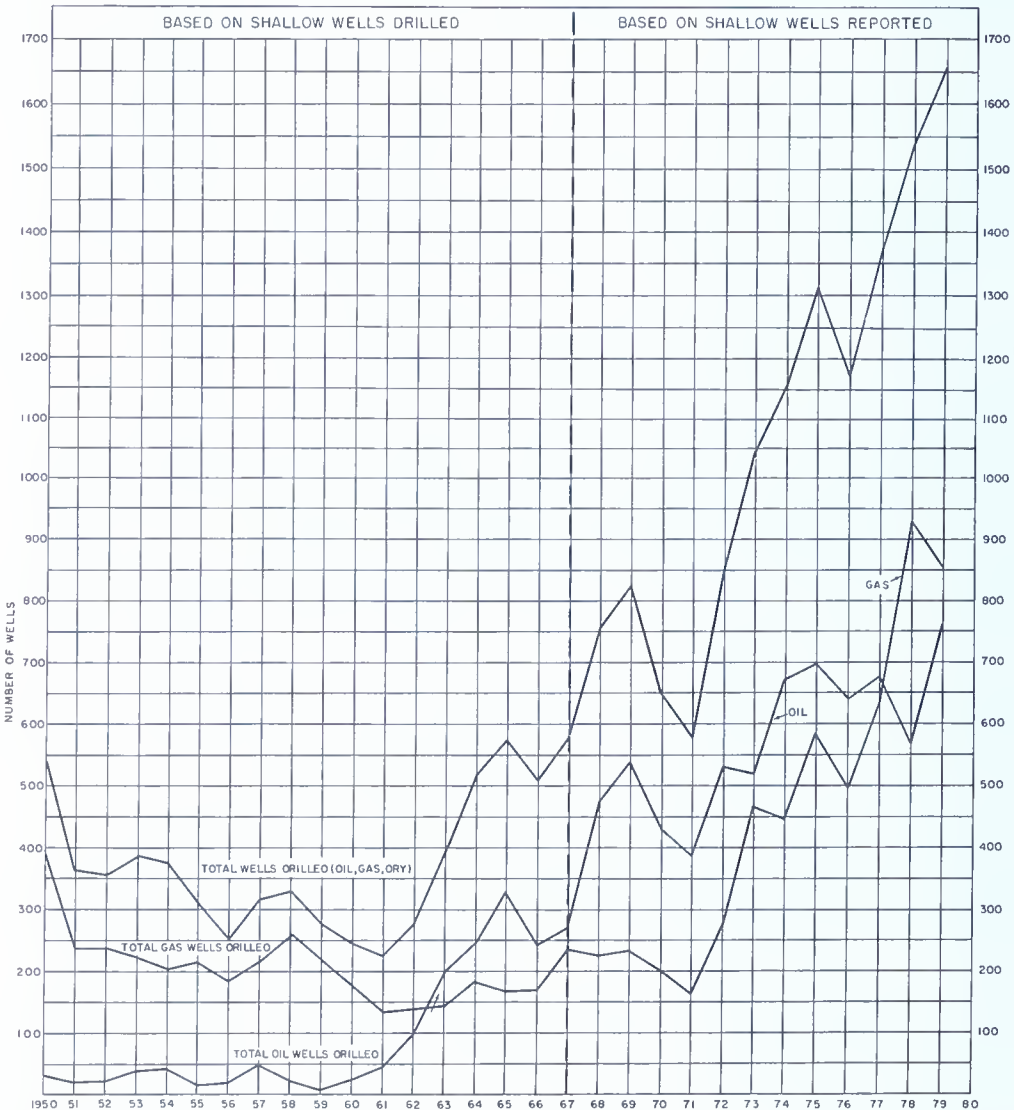


Figure 17. Shallow well activity, 1950-1979 (Late Devonian or younger producing horizons; generally less than 4,000 feet)

The Medina (Lower Silurian) sandstones of Erie and Crawford Counties are usually less than 4,000 feet deep. They produce a small amount of oil with the gas and are regarded as deep horizons due to their geologic age. This exception is restricted to the northwest corner of the Commonwealth.

Deep drilling was up from 148 wells in 1978 to 175 wells in 1979. Erie County, where 134 such wells were drilled, was the most active deep-drilling area; 128 were gas wells, 1 was a combination oil and gas well, and 5 were dry. Figure 18 is a graph showing the annual rate of deep exploration and development from 1930 through 1979.

The Amoco #1 Svetz, drilled in Somerset County in 1974 to 21,460 feet, is still the deepest penetration in the Appalachian Basin. Figure 19 shows 1979 completions divided into wells in Late Devonian and younger formations and wells in Middle Devonian and older formations.

A total of 12,526 million cubic feet of gas and 70,440 barrels of oil were produced from deep reservoirs in 1979. A summary by field and pool of deep gas production in 1979 and the cumulative production from these reservoirs is given in Figure 20. The producing-depth record still stands at 11,458 feet from the Tuscarora (Lower Silurian) sandstone in Summit field, Fayette County.

OTHER ACTIVITIES RELATED TO OIL AND GAS DEVELOPMENTS

GEOPHYSICAL ACTIVITY

The principal nondrilling exploratory tool used in Pennsylvania is the exploration seismograph, which can give approximate to excellent indications of the attitude of the rocks at depth by measuring the time of travel of vibrations to and from the surface. The principal technique now in use in Pennsylvania is Vibroseis, wherein seismic pulses are generated at the surface by mechanical means, rather than by using explosives in very shallow drill holes. The work is usually done by contract crews, and the intensity of activity is gauged by the number of crew-months of operations. Seismic exploration was down slightly from 30.95 crew-months in 1978 to 29.78 crew-months in 1979. Seismic surveys were reported in Bedford, Cambria, Centre, Columbia, Fayette, Fulton, Luzerne, Lycoming, Mercer, McKean, Montour, Northumberland, Snyder, Somerset, Tioga, Warren, Westmoreland, Union, and Venango Counties. Seven seismic-survey permits were issued by the Department of Environmental Resources for evaluation of State Forest lands in the Forbes, Gallitzin, Moshannon, Tiadaghton, and Tioga State Forests in Bedford, Centre, Lycoming, Somerset, Tioga, Union, and Westmoreland Counties.

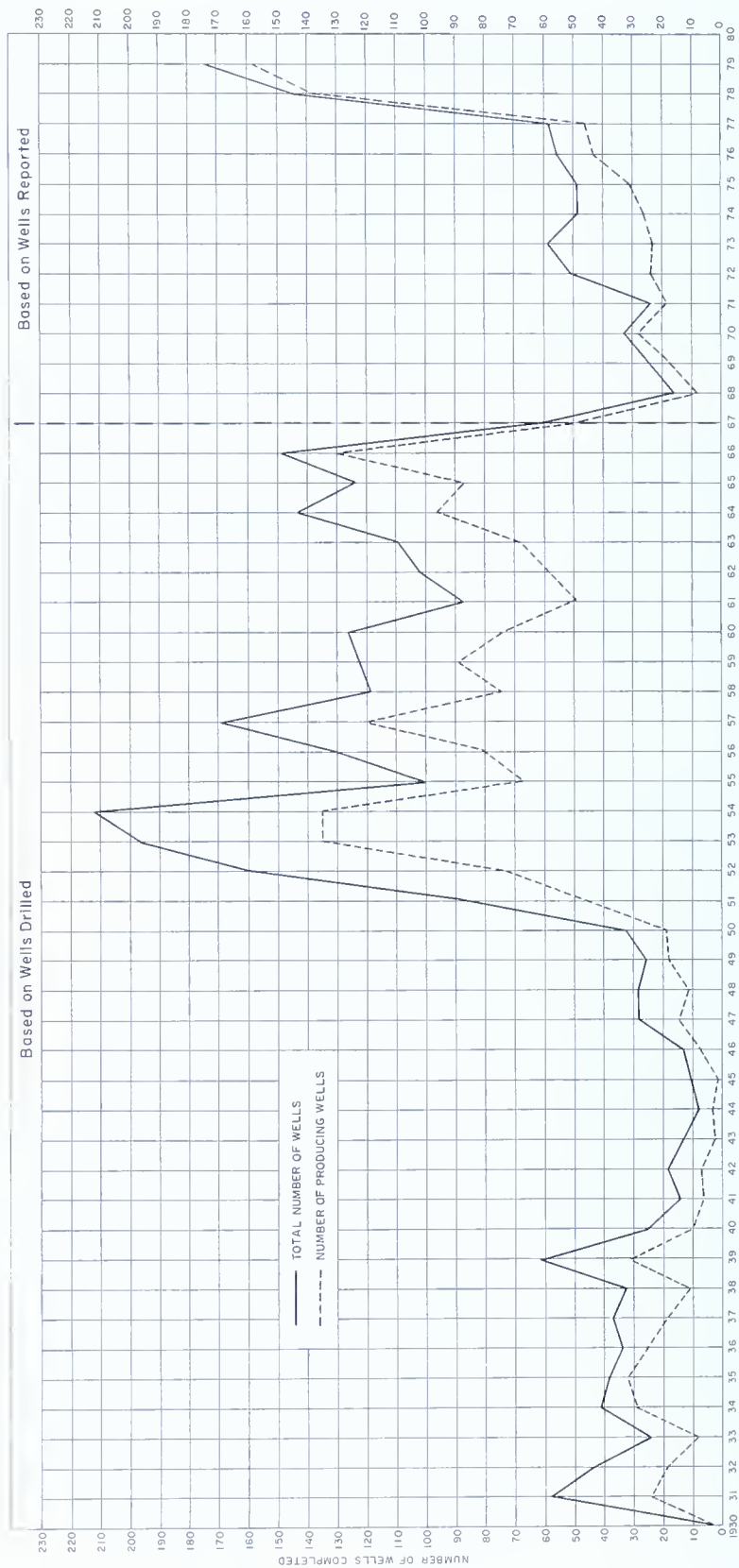


Figure 18. Annual rate of deep sand exploration and development, 1930-1979 (Middle Devonian or older producing horizons; generally more than 4,000 feet)

Figure 19. Drilling and completion of wells reported, 1979
(according to geologic age and depth of
producing horizons)

<i>Shallow — Late Devonian and younger</i>	
NEW WELLS	
Gas	857
Oil	756
Oil and gas	5
Dry	34
<i>Total</i>	1,652
DEEPENED WELLS	
Gas	29
Oil	1
Dry	1
<i>Total</i>	31
MISCELLANEOUS WELLS	
Service	83
<i>Deep — Middle Devonian and older</i>	
NEW WELLS	
Gas	157
Oil and gas	1
Dry	16
<i>Total</i>	174
MISCELLANEOUS WELL	
Service	1
<i>TOTAL ALL WELLS DRILLED</i>	1,941

ACTIVITIES ON STATE LANDS

At the end of 1979, there were 48 active oil and/or gas leases on Pennsylvania Game Commission lands, totaling 69,227 acres. This compares to 47 active leases in 1978 totaling 63,755 acres. During the year, no additional acres of Game Commission lands were put under lease. There were 37 producing gas wells on 12 of the leases. The total production for 1979 from these wells was 377,687 thousand cubic feet of gas. One lease produced 22.91 barrels of oil.

In 1979, income from oil and gas activities on State Forest lands totaled \$1,332,244. These monies were obtained from production royalties, gas storage and exploration acreage rentals, pipeline rights-of-way, and seismic permits. Of this total, royalty payments for the year amounted to \$41,100 for 381,405 thousand cubic feet of gas. Rentals for existing wildcat (exploratory) acreage and past leasing programs totaled \$670,733, and storage rentals were \$607,064. Other income for pipeline rights-of-way, compressor station (location) rentals, and seismic surveys totaled \$13,347.

Figure 20. Gas production from rocks of Middle Devonian or older age in Pennsylvania, 1979
(classified as "deep" production)

County	Field	Pool	Discovery date	Cumulative production at end of 1978 (in Mcf*)	Production 1979 (in Mcf*)	Cumulative production at end of 1979 (in Mcf*)	Status of field or pool at end of 1979
Armstrong	Goheenville	Snyderville	10/23/70	252,973	14,057	267,030	Producing
		Roaring Run					
		Oriskany	12/14/70	6,239,806	356,532	6,596,338	Producing
Bedford and Blair	Pavia	Burley	1/20/61	269,286	39,718	309,004	Shut-in
Cambria	Patton	Pindleton	1/13/69	4,493,958	227,613	4,721,571	Producing
			6/30/69	3,368,137	364,667	3,732,804	Producing
Cameron	East Emporium	Salt Run	11/18/71	4,289,807	27,154	4,316,961	Producing
Cameron and Elk	Hicks Run		6/ 7/56	15,689,068	111,661	15,800,729	Producing
	Whippoorwill		7/10/61				
Cameron, Elk,							
Jefferson, Clear-	Punxsutawney-	TOTAL	9/15/51	484,556,789**	1,454,586	486,011,375	Producing and shut-in
field, and Indiana	Driftwood	Benezette	1/ 5/53	249,133,127	412,311	249,600,764	Producing
		Driftwood	9/15/51		55,326		
		Boone Mt.	9/18/58	105,257,732	266,773	105,524,505	Gas storage and producing
		DuBois	1/ 6/60				
		Helvetia	5/11/60		86,282		Producing
		Reed-Deemer	12/ 1/53	129,175,344	7,271	129,882,179	Shut-in, abandoned, and producing
		Rockton	2/25/55		613,282		
		Sabula	8/26/63	990,586	13,341	1,003,927	Producing
Clearfield	Beech Run	Anderson Creek	9/25/75	53,696	13,535	67,231	Producing
	Boone Mt.	Moshannon	9/15/76	24,963	5,511	30,474	Producing
	West Decatur		3/30/73	2,634,223	615,988	3,250,211	Producing and shut-in
Clinton and Potter	Leidy	TOTAL	1/ 8/50	160,301,810	22,491	160,324,301	Gas storage and producing
		Ole Bull	1/ 9/59	5,501,778	22,491	5,524,269	Producing and shut-in
			9/20/74				Shut-in
Crawford	Athens	Brimstone	1/30/79				Shut-in
		Potash Run	3/18/79				Shut-in
			1/31/76	74,871	43,511	118,382	Producing and shut-in
Cambridge Springs							

Business-		12/31/58	16,833,103	270,010	17,103,113	Producing and abandoned
Elk Benzing Horton Brokenstraw Carter Hill Corry Erie	Lexington	12/31/58	16,833,103	270,010	17,103,113	Producing and abandoned
	Forro	1/ 4/58	15,138	not available	15,138	Producing
	Indian Springs	9/11/57	14,848,938	231,141	15,080,079	Producing and abandoned
	Kastle	7/14/62	340,000	375,902	715,902	Producing
	Lundys Lane	11/ 9/61	2,486,525	165,572	2,652,097	Producing
	Pierce	12/31/58	862,158	15,479	877,637	Producing
	West Mead	7/ 8/74	9,557	2,280	11,837	Producing
	Boot Jack	11/ 7/72	11,275	0	11,275	Abandoned/1978
		9/20/73				Shut-in
		7/27/78				Shut-in
Mill Village New Ireland North East		5/14/79				Shut-in
	TOTAL	4/29/47	1,067,432	3,439	1,070,871	Gas storage and producing
	Beaver Dam	5/20/53	213,732	3,439	217,171	Producing
	Spencer Creek	6/19/79				Shut-in
	Bartosik	3/ 7/79	0	1,586	1,586	Producing
	Blass	2/12/66				Shut-in
	Charter Oaks	5/19/77	39,506	6,442	45,948	Producing and shut-in
	Fairplain	6/ 5/79	0	122	122	Producing
	Fairview	3/12/76	1,068	585	1,653	Producing and shut-in
	Glenwood	8/ 9/77	19,548	12,318	31,866	Producing
Erie	Goddard	8/31/78	0	19,665	19,665	Producing
	Harborcreek	10/20/77	75,426	205,131	280,557	Producing
	Kuhl	8/14/78	0	8,565	8,565	Producing
	Lawrence Park	8/30/77	700	1,000	1,700	Producing
	McKean	1/19/73	135,561	0	135,561	Shut-in
	Waterford	3/21/77	82,518	165,158	247,676	Producing
		7/27/79	0	1,500	1,500	Producing
		5/14/78	0	41,826	41,826	Producing and shut-in
	Bull Reservoir	9/17/60	32,915	12,551	45,466	Producing
	Burgess	10/17/60	341,945	364,687	706,632	Producing and shut-in
Erie	Delhill Corners	6/23/79				Shut-in
	Half Moon	9/ 6/79				Shut-in
	Hornby	6/10/78	1,451	28,654	30,105	Producing and shut-in
	Little Hope	12/ 7/78	0	6,471	6,471	Producing and shut-in
	Orchard Beach	2/18/74	368,829	570,435	939,264	Producing and shut-in

Figure 20. (Continued)

County	Field	Pool	Discovery date	Cumulative production at end of 1978 (in Mcf*)	Production at end of 1979 (in Mcf*)	Cumulative production at end of 1979 (in Mcf*)	Status of field or pool at end of 1979
Fayette	Feik		8/ 8/63	561	7,135	7,696	Producing
	Highhouse	Woodside	3/10/75				Shut-in
	Mill Run		8/17/78				Shut-in
	Ohioptyle	Rugg	12/28/59	4,386,722	52,274	4,438,996	Producing
	Sandy Creek	Quebec Run	6/ 3/69	10,743	5,774	16,517	Producing
	Spruell		10/13/61	6,285,801	530,288	6,816,089	Producing
	Summit	East Summit	12/30/60	27,150	0	27,150	Shut-in
		North Summit	3/24/38	21,529,045	57,514	21,586,559	Producing and abandoned
		South Summit	5/ 9/42	22,396,544	120,128	22,516,672	Producing and abandoned
		Crichton	1/ 9/63	3,013,170	52,116	3,077,286	Producing and abandoned
Indiana	Cherry Hill	Hadden	7/11/63		12,000		
		Tannery	9/21/56	29,604,391	221,303	29,825,694	Producing and shut-in
	Jacksonville		9/30/56	13,792,139	54,644	13,846,783	Producing
	Nolo	Lizowitz	6/19/54	8,293,856	279,844	8,573,700	Producing
	Strongstown	Pineton	12/20/69	8,496,055	161,703	8,657,758	Producing and abandoned
Jefferson	Frostburg	Elk Run	6/30/65	47,893,900	282,908	48,176,808	Producing and shut-in
Lycoming	Salladasburg		6/24/76	9,147	19,992	29,139	Producing and shut-in
McKean	Bradford	Cyclone	2/18/74	806,241	159,558	965,799	Producing
		Minard Run	1/10/75	10,000	1,500	11,500	Producing
Mercer	Corydon		9/ 8/72	0	16,887	16,887	Producing
	Henderson	Kilgore	10/26/66	not available	352,122	352,122	Producing
	Maysville		11/11/76				Shut-in
Potter	Sharon		2/26/77				Shut-in
	Wheatland		7/24/63	256,974	14,022	270,996	Producing and shut-in
	Ulysses	TOTAL	10/ 2/39	4,251,928	21,469	4,327,605	Producing
		Newfield	4/ 2/62		54,208		Producing

Locality	Year	11/11/58	10,922,016**	147,950	11,069,966	Producing
Boswell	Edie	10/18/68	15,734	8,462	24,196	Producing
	Snyder	6/16/60	1,042,756**	23,808	1,066,564	Producing
		8/16/77				Shut-in
Heckman Hollow		5/28/79				Shut-in
Rockwood		10/ 3/77				Shut-in
Shade Creek		5/10/79	0	68,414	68,414	Producing
Shamrock		9/22/73	874,183	2,319,735	3,193,918	Producing
Shanksville		1/ 6/78	22,945	536,323	559,268	Producing
Somerset West		4/ 5/73	107,206	5,116	112,322	Producing
Venango	Duncan					
Franklin-Oak						
Forest	Galloway	11/12/73	47,571	6,275	53,846	Producing
Wesley	Irwin	12/ 1/72	240,963	32,916	273,879	Producing
Warren	Pettigrew	9/26/79				Shut-in
	Whites Run	5/29/70				Shut-in
		10/30/75				Shut-in
Washington	Glyde	9/ 6/61	131,443	437	131,880	Producing
Westmoreland	Kahl	10/23/62	10,619,139	212,460	10,831,599	Producing
	Baileysville	12/26/61	2,008,147	86,119	2,094,266	Producing
	Jacobs Creek					
	Latrobe	8/25/46	5,782,040	86,572	5,868,612	Producing
	Lycippus	8/17/49	6,587,632	41,115	6,628,747	Producing and abandoned
	St. Boniface					
	Chapel	9/13/56	5,848,204	41,115	5,889,319	Producing
	Murrysville	10/22/63	729,997	17,793	747,790	Producing and abandoned
		8/ 8/65	601,880	17,793	619,673	Producing
Westmoreland and						
Somerset	Baldwin	5/22/60		19,722	11,140,492	Producing and abandoned
	Beck	5/16/57	10,817,276	303,494		
	Williams	2/14/58	18,361,963	226,878	18,588,841	Producing
	Sevon Springs	12/ 5/58	7,705,561	97,973	7,803,534	Producing and abandoned
	Blair	12/ 5/58		55,935	6,362,700	Producing
	Tunnel	3/10/65	6,284,655	22,110		
	Seven Springs	8/ 3/66	708,483	19,928	728,411	Producing

*Mcf = thousand cubic feet

***Correction

During the year, 21,950 acres of additional State Forest lands was leased for exploratory and development drilling in Centre, Clinton, Lycoming, and Somerset Counties. The bonus bid for the acreage averaged \$20.96 per acre, for a total of \$460,072. In October, 287 acres of the Moshannon State Forest was placed under lease to be included in the Boone Mountain gas storage field.

At the end of the year, 272,174 acres of State Forest and Park lands was currently under lease for oil and gas exploration and development. This includes 100,493 acres in gas storage areas.

1979 OIL AND GAS EXPLORATORY AND DEVELOPMENT HIGHLIGHTS

These classifications apply to the same wells reported under drilling and completions.

EXPLORATORY WELLS

An exploratory well is a well drilled to (1) find and produce oil or gas in an unproved area; (2) find a new reservoir in a field previously found to be productive of oil or gas in another reservoir; or (3) extend the limits of a known oil or gas reservoir. Exploratory wells include the following: new field wildcat, new pool wildcat, deeper pool test, shallower pool test, or out-post extension test. If the well is not completed for production, it is an exploratory dry hole. Exploratory drilling in 1979 (69 wells) was down 29 percent from 1978 (97 wells), and the success ratio was 78 percent (see Figure 21 for locations of all exploratory wells drilled in 1979).

DEVELOPMENT WELLS

In general, a development well is a well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive. If the well is completed for production, it is classified as an oil or gas development well. If the well is not completed for production, it is classified as a dry development hole. Development drilling in 1979 was up 10 percent from 1978, and had a 98 percent success ratio.

Figure 22 shows both exploratory and development drilling for 1979 by type of well (oil, gas, etc.) and gives total footage. Figure 23 shows exploratory drilling in Pennsylvania by exploratory classification and type of well.

Explanations for exploratory and development wells are modified from definitions used by the Committee on Statistics of Drilling of the American Petroleum Institute/American Association of Petroleum Geologists.

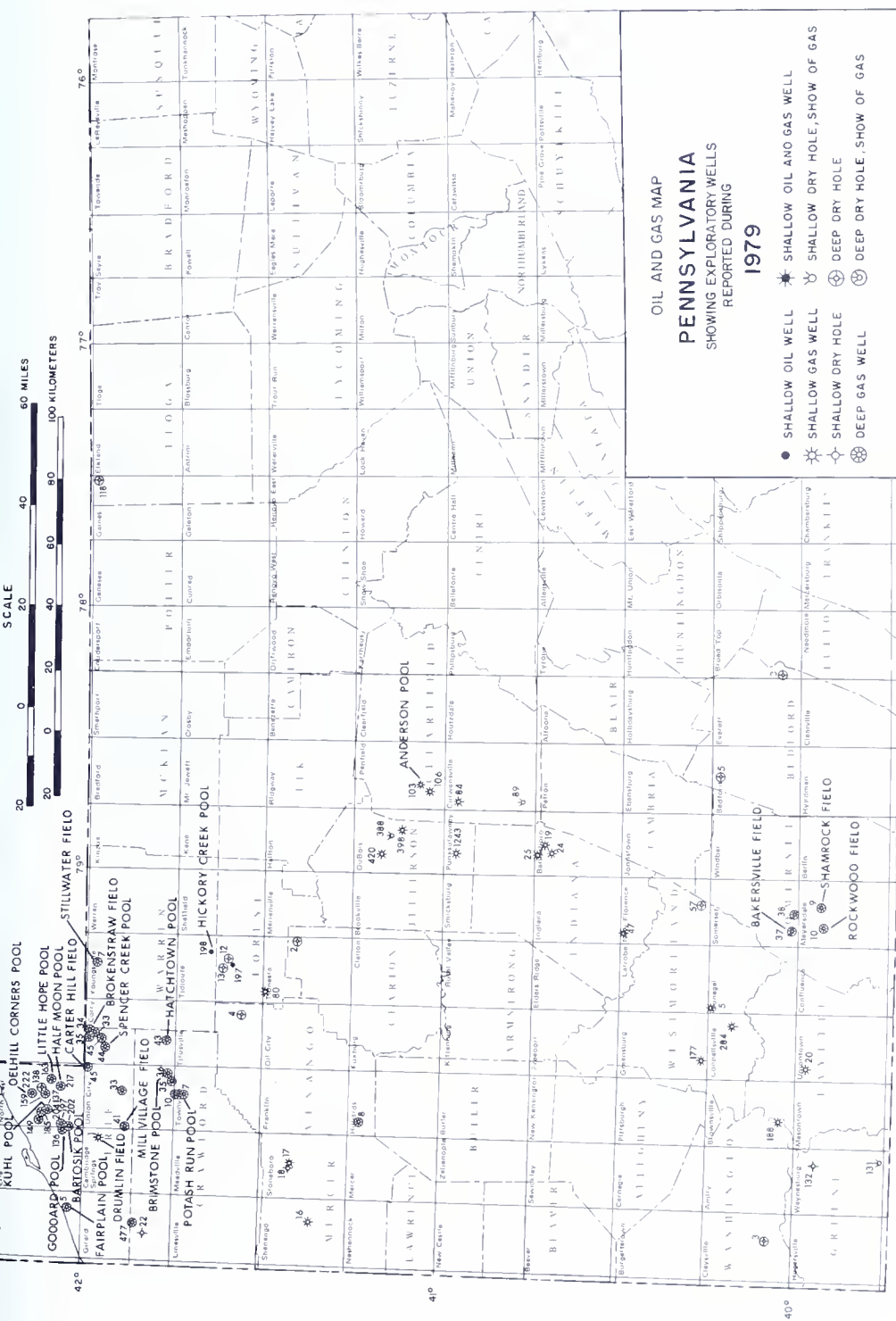


Figure 21. Map of exploratory wells in Pennsylvania reported in 1979

Figure 22. Exploratory and primary development and drilling footages reported, 1979 and 1978

Type of well	1979 Wells	1979 Footage	1978 Wells	1978 Footage	% Change in footage
Exploratory					
Gas.....	52	220,273	70	282,452	
Oil	2	3,286	4	8,933	
Oil and gas	0	0	2	5,698	
Dry.....	15	62,851	21	81,403	
Total (% successful)	69 (78%)	286,410	97 (78%)	378,486	- 24
Development					
Gas.....	991	3,466,752	1,035	3,512,059	
Oil	755	798,541	553	570,847	
Oil and gas	6	12,995	13	27,293	
Dry.....	36	117,007	29	67,357	
Total (% successful)	1,788 (98%)	4,395,295	1,630 (98%)	4,177,556	+ 5
Miscellaneous wells					
Service	84	150,678	21	25,675	+ 487
TOTAL ALL WELLS DRILLED.....	1,941 (97%)	4,832,383	1,748 (97%)	4,581,717	+ 5

Figure 23. Exploratory drilling in Pennsylvania by classification and type of well, 1979

<i>Classification and type of well</i>	<i>No. of wells</i>	<i>Footage</i>
NEW FIELD WILDCATS		
Gas	8	45,118
Dry	6	31,957
Subtotal	14	77,075
NEW POOL WILDCATS		
Oil	1	1,570
Gas	10	40,482
Subtotal	11	42,052
SHALLOWER POOL TESTS		
Gas	2	4,990
Dry	1	934
Subtotal	3	5,924
DEEPER POOL TESTS		
Gas	2	12,676
Dry	3	17,210
Subtotal	5	29,886
OUTPOST EXTENSIONS		
Oil	1	1,716
Gas	30	117,007
Dry	5	12,750
Subtotal	36	131,473
GRAND TOTAL EXPLORATORY WELLS.....	69	286,410

HIGHLIGHTS OF 1979 EXPLORATION

Amoco Production Company and U.G.I. Development Corporation of Valley Forge, Pennsylvania, whose gas utility division services customers in eastern Pennsylvania, began an extensive exploratory drilling program in Pennsylvania in 1977. During 1977, four new fields were discovered, three in Somerset County and one in Centre County. In 1978, one field was completed in Fayette County. This deep drilling program was continued in 1979, and a total of seven wells were completed during the year, five producers and two dry holes. This 1979 drilling program has been centered in Somerset and Centre Counties, and a significant deep test was made in Northumberland County.

In Somerset County, three new fields were discovered in 1979, the Bakersville field, the Shamrock field, and the Rockwood field. Each field produces from the Oriskany sandstone at depths ranging from 8,777 feet to 9,050 feet. The initial potential of the wells ranged from 1,550 Mcfgpd to 2,500 Mcfgpd.

In Centre County, drilling continued in the vicinity of the Devils Elbow field, discovered in 1977 by the Amoco and U.G.I. #1 Texasgulf well, which has remained an incomplete tight hole through 1979. This well is reported to have had an initial potential of 37,000 Mcfgpd natural open flow from the Lower Silurian Tuscarora sandstone. The total depth of the well is 11,187 feet. An offset development well, #2 Texasgulf, was drilled in 1978 to a total depth of 13,052 feet and plugged as a dry hole. A second development well, #1 C & K Coal, was also drilled in 1978 and remains a tight hole. It is reported to have been completed at a total depth of 11,170 feet and to be producing an unknown quantity of gas from the Tuscarora. In 1979, Amoco drilled the #2 Griffith well to a total depth of 6,884 feet, at which point mechanical problems were encountered and the hole was junked. The rig was skidded approximately 50 feet and is drilling to a permitted depth of 9,000 feet. The well is an extension of the Devils Elbow field.

In Northumberland County, Amoco is drilling a significant deep wildcat, #2 Wilhour, permitted to 14,000 feet. This well is located in the Valley and Ridge province of the Appalachian Basin and is a test of overthrust structure. The well was drilling at year's end.

Medina (Lower Silurian) sandstone gas development in northwestern Pennsylvania continued during the year at a rapid pace. A total of 128 new gas wells and one oil and gas combination well were completed in Erie County in the Medina Sandstone Group. Several new fields and pools were completed in Erie, Crawford, and Warren Counties.

Figures 21, 24, and 25 include a map showing the 1979 exploratory effort, a table showing all 1979 new field and new pool discoveries, and a table showing selected exploratory failures.

PROJECTS IN PROGRESS IN 1979, OIL AND GAS GEOLOGY DIVISION

OIL AND GAS BASE MAP PROGRAM

Thirty-two base maps showing locations of oil and gas wells and the outlines of oil, gas, and gas storage fields are available (see Figure 26 for index map of the area covered). Each base map encompasses four 15-minute topographic quadrangles at a scale of 1:62,500, or one inch equals approximately one mile. A 5-minute grid, quadrangle names, county, boundaries, and major rivers and towns make up the background of the base map. All known deep wells (wells that penetrated Middle Devonian or older rocks) and those shallow wells (wells not reaching Middle Devonian) on record with the Survey are located. Status (dry, oil, gas, etc.) of each, and elevation and total depth of many are shown. Symbols indicate whether borehole geo-

Figure 24. Reported new field and new pool discoveries in Pennsylvania, 1979

County and permit no.	Quadrangle and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T.D. *	Prod. depth (feet)	Prod. formation or zone *	Initial daily prod.	Field or pool name	Explor. class **
Clearfield CLE-20863	Pentfield 103	Doran and Associates, Inc. #1 T. L. Borchert	6/28/79	3,375	Canadaway (D)	2,699	Canadaway (D)	411 Mcf	Anderson pool	NPD
Crawford CRA-20588	Corry 43	Wainoco Oil & Gas Company #1 Lee A. Hopkins	6/27/79	5,260	Queenston (O)	5,101	Medina (S)	198 Mcf	Hatchtown pool	DPD
Crawford CRA-20567	Townville 7	Wainoco Oil & Gas Company #7 Scott J. Preston	3/18/79	4,820	Queenston (O)	4,711	Medina (S)	540 Mcf	Potash Run pool	NPD
Crawford CRA-20561	Union City 36	Wainoco Oil & Gas Company #5 James & Helen Anderson	1/30/79	5,085	Queenston (O)	4,955	Medina (S)	7,898 Mcf	Brimstone pool	NPD
Erie ERI-20794	Cambridge Springs 1	Gordon Marsh #1 Marsh	10/21/78	1,107	Dev. shale (D)	1,107	Dev. shale (D)	30 Mcf	Drumlin field	NFD
Erie ERI-20554	Corry 34	Appalachian Energy, Inc. #1 Harold Raymond	7/27/78	4,260	Queenston (O)	4,183	Medina (S)	1,100 Mcf	Brokenstraw field	NFD
Erie ERI-20751	Corry 44	Doran and Associates, Inc. #1 Cubbon Lumber	6/19/79	4,404	Queenston (O)	4,334	Medina (S)	385 Mcf	Spencer Creek pool	NPD
Erie ERI-20735	Fairview 5	Envirogas, Inc. #1 George Mason	6/ 5/79	2,870	Queenston (O)	2,753	Medina (S)	111 Mcf	Fairplain pool	NPD
Erie ERI-20589	Erie 136	Envirogas, Inc. #1 John Koehler	8/31/78	3,705	Queenston (O)	3,612	Medina (S)	318 Mcf	Goddard pool	NPD
Erie ERI-20557	North East 137	Envirogas, Inc. #1 Walter Kuhl	8/14/78	3,606	Queenston (O)	3,528	Medina (S)	259 Mcf	Kuhl pool	NPD
Erie ERI-20652	North East 163	Envirogas, Inc. #1 Raleigh Chesley	12/ 7/78	3,724	Queenston (O)	3,639	Medina (S)	551 Mcf	Little Hope pool	NPD
Erie ERI-20704	North East 202	Envirogas, Inc. #1 James Fiske	3/ 7/79	2,580	Keyser (D-S)	2,506	Oriskany (D)	2,700 Mcf	Bartosik pool	SPD
Erie ERI-20812	North East 217	Hanley and Bird #1 W. Halloran	9/ 6/79	3,656	Queenston (O)	3,626	Medina (S)	70 Mcf	Half Moon pool	NPD
Erie ERI-20793	North East 222	Envirogas, Inc. #2 Carl Bemis	6/23/79	2,410	Onondaga (D)	2,410	Onondaga (D)	11,400 Mcf	Delhill Corners pool	SPD
Erie ERI-20831	Union City 41	N.E.A. Cross Company #1 George & Shirley McLaughlin	7/27/79	4,070	Queenston (O)	3,918	Medina (S)	2,300 Mcf	Mill Village field	NFD
Erie ERI-20720	Union City 45	Envirogas, Inc. #2 Leon Morton	5/14/79	4,368	Queenston (O)	4,285	Medina (S)	551 Mcf	Carter Hill field	NFD

Figure 24. (Continued)

County and permit no.	Quadrangle and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T.D.*	Prod. depth (feet)	Prod. formation or zone*	Initial daily prod.	Field or pool name	Explor. class**
Fayette FAY-20250	Uniontown 20	Peoples Natural Gas Company #1 Michael Harim	10/13/79	5,237	Canadaway (D)	5,237	Canadaway (D)	4 Mcf	Unnamed; noncommercial	NPD
Somerset SOM-20080	Meyersdale 9	Amoco Production and U.G.I. #1 John D. Weaver	5/10/79	9,050	Helderberg (D)	8,954	Oriskany (D)	2,500 Mcf	Shamrock field	NFD
Somerset SOM-20081	Meyersdale 10	Amoco Production and U.G.I. #1 Helen Wolf Gas Unit	5/28/79	8,791	Helderberg (D)	8,644	Oriskany (D)	1,550 Mcf	Rockwood field	NFD
Somerset SOM-20072	Somerset 37	Amoco Production and U.G.I. #1 Dale S. Barron	1/14/79	8,852	Oriskany (D)	8,759	Oriskany (D)	2,000 Mcf	Bakersville field	NFD
Warren WAR-26458	Tidioute 198	I. E. Kelley Lot 5221 KIN-2103	6/27/78	1,570	Canadaway (D)	608	Venango 3 (D)	10 Bbl	Hickory Creek pool	NPD
Warren WAR-27425	Youngsville 7	Red Leaf Oil, Ltd. Warren E. Bartisch	9/26/79	4,620	Queenston (O)	4,510	Medina (S)	1,100 Mcf	Stillwater field	NFD

* (D) = Devonian; (S) = Silurian; (D-S) = Devonian-Silurian; (O) = Ordovician

** NFD = new field discovery; NPD = new pool discovery; DPD = deeper pool discovery; SPD = shallower pool discovery

Figure 25. Selected exploratory failures reported in Pennsylvania, 1979

County and permit no.	Quadrangle and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T.D.*	Explor. class**
Bedford BED-20057	Bedford 5	Adobe Oil and Gas Corp. #1 George & Sara Hamilton	7/12/78	6,585	Helderberg (D)	NFW
Bedford BED-20058	Broad Top 3	Consolidated Gas Supply #1 Jack E. Colledge	3/31/79	7,853	Gander Run Shale Member (D)	NFW
Clarion CL-A-20751	Tionesta 2	Peoples Natural Gas Co. #7 North Penn Gas Company	4/17/79	7,316	Queenston (O)	DPT
Forest FOR-22185	Tidioute 12	John A. Vertullo Lot 5200, DJV-0001	9/14/78	4,401	Helderberg (D)	NFW
Forest FOR-22182	Tidioute 13	John A. Vertullo Lot 5202, DJV-0201	9/2/78	4,245	Helderberg (D)	NFW
Greene GRE-21340	Waynesburg 132	U. S. Bureau of Mines #M-1 Morgan Township	1/16/76	934	Upper Freeport coal (P)	SPT
Tioga TIO-20074	Gaines 118	Columbia Gas Transmission #1 Marion B. Payne	10/15/77	5,138	Helderberg (D)	NFW
Venango VEN-25522	Titusville 4	Quaker State Oil Refining #1 McCaslin	3/20/78	6,060	Queenston (O)	DPT
Washington WAS-21147	Claysville 3	Pennzoil Company #1 Edgar Calvert	9/20/78	7,416	Helderberg (D)	DPT

* (D) = Devonian; (O) = Ordovician; (P) = Pennsylvanian

** NFW = new field wildcard; DPT = deeper pool test; SPT = shallower pool test

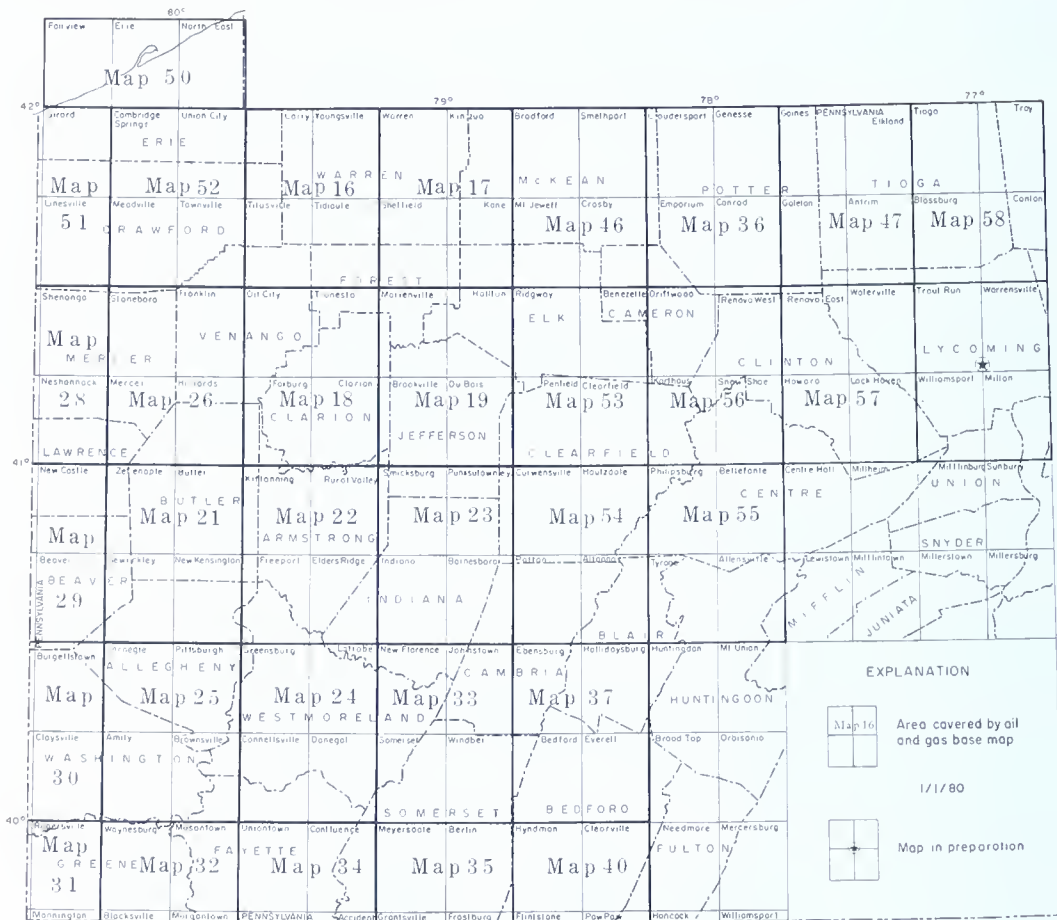


Figure 26. Index of available subsurface base maps

physical log and sample data are on file in the Survey's Oil and Gas Geology Division office in Pittsburgh. An index map near the legend shows the outlines of oil, gas, and gas storage fields within the mapped area, thus indicating the extent of areas of pre-1956 drilling. A list of field names is also included. All maps were updated in 1979.

Paper prints of the base maps may be obtained by writing to the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125. The cost of each base map is \$0.50, plus a 6 percent sales tax to Pennsylvania residents. A check for the appropriate total amount, made payable to the Commonwealth of Pennsylvania, must accompany the order. When ordering, please specify the map number.

A cross index of state permit numbers and quadrangle map numbers used on the base maps is available from the Oil and Gas Geology Division of the Pennsylvania Geological Survey, 1201 Kossman Building, 100 Forbes Avenue, Pittsburgh, Pennsylvania 15222. This index is arranged by quadrangles. Please specify the quadrangle when requesting this literature.

PENNSYLVANIA OIL AND GAS FIELDS PROJECT

by John A. Harper and Christopher D. Laughrey

The Pennsylvania Geological Survey, Oil and Gas Geology Division, is being funded by the University of Oklahoma to update, standardize, and provide historical data on Pennsylvania's oil and gas fields. The two-year project involves three major tasks: (1) determination of the historical data (names, dates of discovery and production, geographic location) of all the fields in Pennsylvania; (2) determination of production reservoirs and the discovery and production dates, depths, and trap types for each field; and (3) encoding this information into the University of Oklahoma's computer system.

Determining the historical data has presented numerous problems. Some of the information has been lost with time, whereas other information is confused because different workers have used different names, dates, and geographic localities. Data were gathered from many documents, published and unpublished, from the Second, Third, and Fourth Pennsylvania Geological Surveys, the U. S. Geological Survey, and professional publications, as well as from well records, old well data cards, and other information in the Survey's files. The project requires not only the designation of fields, but also their definitions and limits. The reader is referred to previously published oil and gas fields maps (see Figure 27) to see how the fields have developed over the years. Boundaries between the fields and pools were designated in a semi-arbitrary fashion. The original producing areas of each field were determined and then common boundaries were chosen approximately halfway between them. The lines were drawn using key topographic and geographic features.

Determination of the producing reservoirs for each field requires looking at operators' well records and searching through old publications. The majority of the time spent during the first year of the project was used in designating the production reservoirs for each of the approximately 27,000 well records in the Survey's files and spotting this information on data compilation maps. The names used in this project for reservoirs are, for the most part, general group names. The reader should refer to the generalized stratigraphic charts compiled by Heyman (1977 and 1979) for these names. In addition, Figure 28 indicates the group names used in the fields map project for Mississippian and Upper Devonian reservoirs.

The final product of this project, a revised oil and gas fields map, will be unique to Pennsylvania in that it will show graphically the main producing reservoirs and boundaries for each field. The reservoirs will be indicated by various colors and patterns, resulting in a "geologic map" appearance. This will enable the viewer to see at a glance the major reservoirs in any area of interest. In addition, the oil fields will be patterned to distinguish them from

Figure 27. Previous Pennsylvania oil and gas fields maps

1. Carll, J. F., 1890. **Seventh report on the oil and gas fields of western Pennsylvania for 1887, 1888.** Pennsylvania Geological Survey, 2nd ser., v. 15, 356 p.
Plate 2 is an oil and gas fields map showing general outlines of the producing areas. Almost every field is oriented along structural trends.
2. Hice, R. R., 1916. **Oil and gas map of southwestern Pennsylvania.** Pennsylvania Geological Survey, 3rd ser., 22 p.
This unnumbered publication of the Third Survey accompanies a 1:250,000 scale map of the oil and gas fields south of latitude 41°15'N, and west of longitude 78°30'W. Fields are still oriented along structural axes, but are beginning to expand.
3. Ashley, G. H., and Robinson, J. F., 1922. **The oil and gas fields of Pennsylvania.** Pennsylvania Geological Survey, 4th ser., Mineral Resource Report 1, 79 p.
The first comprehensive report on the oil and gas fields of Pennsylvania and the first comprehensive report on oil and gas in general since Carll's work in the 1880's. Plate 1 is an oil and gas fields map showing the coalescing of shallow fields. The map also lists the producing reservoirs from each field.
4. Sisler, J. D., Ashley, G. H., Moyer, F. T., and Hickock, W. O., 1933. **Contributions to oil and gas geology of western Pennsylvania.** Pennsylvania Geological Survey, 4th ser., Mineral Resource Report 19, 94 p.
Four articles on oil and gas geology in Pennsylvania are presented with an accompanying oil and gas fields map. The fields map shows structure contours as well as the fields.
5. Lytle, W. S., and Fairall, Virginia, 1964. **Oil and gas fields of Pennsylvania.** Pennsylvania Geological Survey, 4th ser., Map 3, 1964 ed.
The map, which does not have an accompanying text, shows the distinction between shallow and deep fields for the first time.
6. Lytle, W. S., and Balogh, L. J., 1977. **Oil and gas fields of Pennsylvania.** Pennsylvania Geological Survey, 4th ser., Map 3, 1977 ed.
This most recent map includes pools and storage areas as well as fields.

gas fields. Field and pool boundaries will be added to graphically separate the formally named producing areas, and each field and pool will have a number or letter designation. Storage fields and pools are to be a single color as in the present fields map.

The project will be completed with the final drafting and printing of the oil and gas fields map. It is hoped that this map and the project that initiated it will offer some clarification and stability to the present and future designation of fields and pools in Pennsylvania, and to the classification of wells within them.

References

- Heyman, Louis (1977), *Subsurface rock correlation diagram, Allegheny Plateau of Pennsylvania*, p. 29-32, in Lytle, W. S., and others, *Oil and gas developments in Pennsylvania in 1976*, Pennsylvania Geological Survey, 4th ser., Progress Report 190, 49 p.
- _____. (1979), *A subsurface rock correlation diagram, Allegheny Plateau of Pennsylvania*, p. 43-45, in Piotrowski, R. G., and others, *Oil and gas developments in Pennsylvania in 1978*, Pennsylvania Geological Survey, 4th ser., Progress Report 192, 61 p.
- Piotrowski, R. G., and Krajewski, S. A. (1977), *Devonian research in Pennsylvania*, p. 33-42, in Lytle, W. S., and others, *Oil and gas developments in Pennsylvania in 1976*, Pennsylvania Geological Survey, 4th ser., Progress Report 190, 49 p.

SYSTEM	GROUP*	FORMATION**	SAND NAMES
MISSISSIPPIAN	POCONO		Loyalhanna, Big Injun, Mountain, Burgoon, Shenango, Slippery Rock, Squaw, Second Gas, Berea, Cussewago, Corry, Knapp, Murrys ville
		RICEVILLE	Riceville Shale (north-central Pennsylvania)
	VENANGO	ZONE D	Venango First, Hundred Foot, Fifty Foot, Ganiz, Drake, Tuna, Red Valley, Lytle, Rosenberry, White, Salamanca, Venango Second, Salt, Upper Nineveh, Lower Nineveh, Snee, Shira, Boulder, Venango Third Stray, Venango Third, Venango Fourth (Fourth), Venango Fifth (Fifth), Venango Sixth (Sixth), Grey, Black, Green, Gordon Stray, Gordon, McDonald Fourth, McDonald Fifth, Knox Third Stray, Knox Third, Knox Fourth, Knox Fifth, Wolf Creek, Clarion, Byram, Conewango, LeBoeuf, Magee Hollow, Bayard, Elizabeth, Sweet Richard
		ZONE C ZONE B	Pink Rock
DEVONIAN	BRADFORD		Warren First, Warren Second, Queen, Glade, Bradford First, Eighty Foot, Clarendon Stray, Clarendon, Sugar Run, Watsonville, Dew Drop, Chipmunk, Cherry Grove, Gartland, Upper Balltown, Lower Balltown, Speechley, Tiona, Cooper Stray, Cooper, Bradford Second, Klondike, Harrisburg Run, Deerlick, Sliverville, Balltown (in Indiana County), Bradford Third (Bradford First in Indiana County), Lewis Run (Bradford Third in Indiana County), Upper Kane (Bradford Third in Indiana County), Lower Kane, Sartwell
		ZONE B ₀	Haskill, Reily, Elk First, Elk Second, Elk Third, Elk Fourth, Elk Fifth, Humphrey, Benson, Alexander
	ELK	ZONE A	
UPPER DEVONIAN	"DEVONIAN SHALE"	Dunkirk Java West Falls Sonyea Genesee Hamilton	
MIDDLE DEVONIAN			

* Group names as used for the new oil and gas fields map.

** Zone names as used by Piotrowski and Krajewski (1977); formation names as used by Piotrowski and Harper (1979).

Figure 28. Generalized stratigraphic column of producing sandstones in the Devonian of Pennsylvania. Position of most sand names within the group or zone refers only to the position of the sand in the area where it was first named or used (modified from Piotrowski and Krajewski, 1977, and from Piotrowski and Harper, 1979).

Piotrowski, R. G., and Harper, J. A. (1979), *Black shale and sandstone facies of the Devonian "Catskill" clastic wedge in the subsurface of western Pennsylvania*, METC/EGSP Series #13, Morgantown, West Virginia, 40 p.

ORISKANY SANDSTONE PROJECT

by Kathleen D. Abel and Louis Heyman

A regional study of the Oriskany sandstone in the subsurface of Pennsylvania by Kathleen D. Abel and Louis Heyman was completed this year and is scheduled for publication in late 1980. The study is based on gamma-ray log correlations of all available wells in Pennsylvania that penetrate the Oriskany.

A Ridgeley format based on gamma-ray log signature and including the Oriskany sandstone has been defined and traced northward from the type Ridgeley in West Virginia. The correlations show that the Ridgeley thins from southeast to northwest and pinches out along a line between Lawrence and Potter Counties. Some Oriskany fields such as the Penfield field, Clearfield County, and the Elk Run pool, Jefferson County, are apparently related to stratigraphic entrapment along the Ridgeley pinchout. Future production may be related to the pinchout in Armstrong, Butler, and Lawrence Counties, especially along anticlinal axes.

Most other Oriskany fields are related to structure. The most recent discoveries are in Somerset County, and further production is anticipated there. Northwest of the Ridgeley pinchout, sandstone at the Oriskany horizon (probably basal Onondaga) is patchy. Although there are a few Oriskany fields northwest of the pinchout, production is unpredictable because of the patchiness of the sandstone and because most wells there encounter saltwater at the Oriskany horizon. However, the Oriskany of northwestern Pennsylvania should not be ruled out as a possible secondary target.

The following maps at a scale of 1:1,000,000 are the final products of the Oriskany project; they are now available on open file at the Pennsylvania Geological Survey, Oil and Gas Geology Division.

- 1) Ridgeley isopach and sub-Onondaga subcrop map
- 2) Sandstone thickness map
- 3) Oriskany production map
- 4) Drilling depth map (shows depth to top of Oriskany)

LOWER SILURIAN MEDINA SANDSTONE GROUP PROJECT, NORTHWESTERN PENNSYLVANIA

by Robert G. Piotrowski

The Lower Silurian Medina Sandstone Group is one of the most actively drilled targets for natural gas in Pennsylvania. In 1979, 128 gas wells were

successfully completed in Erie County alone in this horizon. The Medina Group sandstone will also be the primary target for drilling in the Pennsylvania portion of Lake Erie, which may soon be opened for exploration.

The objectives of the Oil and Gas Geology Division's study of this stratigraphic unit were to understand the regional stratigraphy of the Lower Silurian clastics in Pennsylvania with emphasis on the Medina Group sands in northwestern Pennsylvania, to map current gas production from the Medina Group in northwestern Pennsylvania, to understand the geology of the Medina Group, and to aid drillers in its future development.

The study consists first of a series of nine regional cross sections. The purpose of the cross sections is to define the regional mapping units in northwestern Pennsylvania, show their distribution, and indicate their equivalency to units in Ohio, New York, and across Lake Erie into Canada. The cross sections also tie the Lower Silurian Medina Group sandstones to the equivalent Lower Silurian Tuscarora sandstones in central Pennsylvania. Figure 29 shows the distribution of this cross-section network, and the distribution of the Medina and equivalent facies.

A series of eleven maps were also constructed for northwestern Pennsylvania detailing the Lower Silurian clastics. The maps include: (1) gas production from the Medina Group in northwestern Pennsylvania; (2) drilling depth map to the top of the Queenston; (3) structure on top of the Queenston; a series of isopach maps including (4) isopach of the Clinton Group, (5) isopach of the Medina Group, (6) isopach of the Whirlpool sandstone, (7) isopach of the Cabot Head shale, (8) isopach of the Grimsby sandstone; and a series of sandstone quality maps including (9) and (10) net sand isolith maps (50 percent and 75 percent gamma-ray sand cutoff) of the Medina Group, and (11) sand/shale ratio map of the Medina Group.

All eleven maps detailing the Lower Silurian clastics in northwestern Pennsylvania will be published at a scale of 1:500,000. The cross-section network will not be published but will be available as open-file material at the Survey's office in Pittsburgh. Publication of this report is anticipated in late 1980 upon completion of drafting and review. Prior to publication, the report data are available for inspection at the Pittsburgh office of the Survey.

OPEN-FILE REPORTS AND OTHER DATA AVAILABLE

The following reports and other data are available on open file at the Pennsylvania Geological Survey, Oil and Gas Geology Division, 1201 Kossman Building, 100 Forbes Avenue, Pittsburgh, Pennsylvania 15222.

(1) *Surface to Middle Devonian (Onondagan) Stratigraphy, Part I (STOMDES) (1972)*, by D. R. Kelley and W. R. Wagner. 15 p., 8 cross sections, vertical scale 1 inch = 100 feet.

(2) *Deep sand exploration and gas developments in Pennsylvania (1973)*, by Lillian A. Heeren. 1 map in 6 sheets, scale 1:250,000.

(3) *Salina or equivalent and deeper penetrations of Pennsylvania (1973)*, by D. R. Kelley and L. J. Balogh. 1 map, scale 1:500,000.

(4) *Tully and deeper formations, brine analyses of Pennsylvania (1973)*, by D. R. Kelley and L. A. Heeren. 1 chart and map, scale 1:500,000.

(5) *Stratigraphic framework of the Greater Pittsburgh area, Parts 1 and 2 (1972)*, by W. R. Wagner and W. S. Lytle. 20 p., 9 sections in 13 sheets.

(6) *Active gas storage fields map of Pennsylvania*, by L. J. Balogh, 1 map, scale 1:500,000.

(7) *A subsurface rock correlation diagram, surface to basement, Allegheny Plateau of Pennsylvania*, by Louis Heyman.

Also on open file at the Pennsylvania Geological Survey's Pittsburgh office are over 27,800 drillers' logs, along with 3,075 mechanical logs; a Sample Library containing approximately 1,200 wells, 90 of which are out-of-state wells; and a Core Library containing cores on approximately 40 wells.

ACTIVITIES OF THE OIL AND GAS REGULATORY DIVISION

SUMMARY OF REGULATORY FUNCTIONS

by John A. Ifft

The Division of Oil and Gas Regulation administers several different laws affecting the oil and gas industry. Act 225 provides for permitting of oil and gas wells, the underground storage of gas, mining around wells, and the methods of casing and plugging oil and gas wells. Act 359, the Oil and Gas Conservation law, pertains only to the deeper producing horizons, and provides for the spacing of oil and gas wells, unitization of interests, and the protection of the correlative rights of oil and gas owners. Act 38 relates to the underground storage of gas and the protection of the people residing in the area.

Figures 30 and 31 summarize the work of the Division during 1979.

ACTIVITIES OF THE NATURAL GAS POLICY ACT (N.G.P.A.) SECTION

by Charles H. Updegraff

The Bureau's Division of Oil and Gas Regulation started mailing information and forms relative to the Natural Gas Policy Act of 1978 (N.G.P.A.) on November 15, 1979. This Act was part of a total National

Figure 30. Summary of activities of the Oil and Gas Regulatory Division, 1956-1979

	Cumulative from											Grand total
	1956-1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1956-79
1. Drilling permits issued in coal areas	4,394	322	342	469	694	648	916	782	1,166	1,429	1,332	12,494
2. Drilling permits issued coal areas, Act 359	224	16	10	16	11	15	26	12	27	21	42	420
3. Total wells, coal areas (items 1 and 2)	4,618	338	352	485	705	663	942	794	1,193	1,450	1,374	12,914
4. Drilling permits issued in noncoal areas	1,103	914	956	1,247	1,522	1,364	1,042	1,381	1,510	1,806	2,348	15,193
5. Drilling permits issued noncoal areas, Act 359	214	9	12	37	61	34	23	15	51	93	182	731
6. Total permits issued (items 3, 4, and 5)	5,935	1,261	1,320	1,769	2,288	2,061	2,007	2,190	2,754	3,349	3,904	28,838
7. Reported wells in noncoal areas — file numbers issued	8,202*	27*	2*	10*	0	0	0	0	0	0	0	8,241*
8. Total wells, noncoal areas (items 4, 5, and 7)	9,519	950	970	1,294	1,583	1,398	1,065	1,396	1,561	1,899	2,530	24,165
9. Total wells, coal and noncoal areas (items 6 and 7)	14,137	1,288	1,322	1,779	2,288	2,061	2,007	2,190	2,754	3,349	3,904	37,079
10. Total drilling permits issued, Act 359 (items 2 and 5)	438	25	22	53	72	49	49	27	78	114	224	1,151
11. Drilling cancelled — permits and noncoal file numbers	1,108	244	236	169	327	597	383	667	469	412	467	5,079
12. Plugging numbers issued	6,374	1,721	1,383	1,860	1,681	1,511	1,630	1,959	1,300	2,057	1,225	22,701
13. Plugging numbers cancelled	318	119	116	83	180	112	119	92	71	60	66	1,336
14. Wells reported plugged and abandoned	5,142	992	1,573	1,317	1,410	1,089	1,284	1,493	1,144	991	1,307	17,742
15. Pillar permits issued	2,131	164	105	142	96	96	94	104	125	83	150	3,290
16. Pillar permits cancelled	18	0	0	1	0	1	0	2	0	0	0	22

Act 359 of 1961 — Oil and Gas Conservation Law, approved July 25, 1961. Effective date September 25, 1961.

*Prior to September 30, 1968, permits were not required for wells in noncoal areas, except those wells coming within purview of Act 359 of 1961.

Act 265, approved July 31, 1968, effective September 30, 1968 — requires permits to be issued for all wells.

Figure 31. Summary of activities of the Oil and Gas Regulatory
Division by county, 1979

County	Permits issued		Permits issued		Drilling cancelled		Plugging numbers issued		Plugging cancelled		Wells reported plugged and abandoned		Pillar permits issued		DRILLING PERMITS ISSUED	
	coal areas	noncoal areas	coal areas	noncoal areas	cancelled	issued	cancelled	issued	cancelled	issued	plugged and abandoned	permitted	issued	permitted	Coal areas	Noncoal areas
Allegheny.....	25	2	2	6	2	0	0	0	0	0	8	7	0	0	0	0
Armstrong.....	147	0	0	25	6	0	0	0	0	0	6	36	0	0	0	0
Beaver.....	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bedford.....	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0
Butler.....	10	3	0	0	5	0	0	0	0	0	2	24	0	0	0	0
Cambria.....	4	0	0	10	0	0	0	0	0	0	1	0	0	0	0	0
Cameron.....	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Centre.....	4	1	4	4	1	0	0	0	0	0	0	0	2	3	0	0
Clarion.....	29	30	8	8	19	5	0	0	0	0	21	0	2	0	0	0
Clearfield.....	69	0	33	0	5	0	0	0	0	0	5	0	3	0	0	0
Clinton.....	0	9	0	0	1	0	0	0	0	0	1	0	0	0	0	0
Crawford.....	0	91	6	6	4	0	0	0	0	0	2	0	0	45	0	0
Elk.....	0	86	2	2	54	3	0	0	0	0	22	0	0	0	0	0
Erie.....	0	261	52	10	10	2	0	0	0	0	2	0	0	108	0	0
Fayette.....	14	2	10	2	2	0	0	0	0	0	3	0	1	1	0	0
Forest.....	0	302	58	61	2	2	0	0	0	0	33	0	0	0	0	0
Greene.....	16	0	4	4	12	0	0	0	0	0	6	29	0	0	0	0
Indiana.....	644	0	31	11	0	0	0	0	0	0	5	20	4	0	0	0
Jefferson.....	137	27	55	29	1	0	0	0	0	0	18	1	0	1	0	0
Lawrence.....	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
McKean.....	0	384	21	539	49	0	0	0	0	0	763	0	0	1	0	0
Mercer.....	0	19	4	0	0	0	0	0	0	0	0	0	0	8	0	0
Northumberland.....	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Figure 31. (Continued)

County	Permits issued		Drilling cancelled	Plugging numbers issued	Plugging cancelled	Wells reported plugged and abandoned	Pillar permits issued	DRILLING PERMITS ISSUED	
	coal areas	noncoal areas						Coal areas	Act 359 of 1961 Noncoal areas
Potter.....	0	20	8	5	0	6	0	0	1
Somerset	25	0	2	4	0	2	0	25	0
Tioga	0	11	0	3	0	3	0	0	0
Venango.....	3	798	41	212	1	234	0	0	1
Warren.....	0	470	27	221	2	150	0	0	12
Washington	59	1	19	3	0	2	30	3	0
Westmoreland	186	0	41	14	1	10	3	0	0
Total	1,374	2,530	467	1,225	66	1,307	150	42	182

Energy Plan signed into law by President Carter on November 9, 1978, and the effective date was December 1, 1978. The Federal Energy Regulatory Commission (FERC) was empowered to administer the Act by adopting rules and regulations consistent with the provisions of the Act. The Act provides a gradual move toward price deregulation by 1985 of new discovered gas, with specified price increases for all categories of natural gas determined by well classification. It was necessary to obtain Pennsylvania legislative authority for a state agency to make well classifications as required by FERC. This authority was granted to the Department of Environmental Resources by Act 21, signed into law by Governor Thornburgh on June 28, 1979. Implementation of the Act was assigned to the Bureau of Topographic and Geologic Survey's Division of Oil and Gas Regulation.

The Bureau then prepared regulations based on the federal Act, detailing the procedures that Pennsylvania producers must follow to qualify for well classification. These regulations were passed by the Environmental Quality Board on October 23, 1979, effective upon publication in the Pennsylvania Bulletin on November 3, 1979.

The function of the staff will be to process the applications by examining the data submitted by each applicant to justify the category for which he seeks a determination. The staff will be involved in reviewing classification requests for four major categories: "New Natural Gas," "New Onshore Production Well," "High Cost Gas," and "Stripper Well," three of which have several subcategories. Each category has a different allowable maximum ceiling price set by federal law. It is the staff's obligation to assure that the data submitted with each application are sufficient to meet the federal criteria for the well classification that is requested by the applicant.

A backlog of approximately 4,000 applications is on file, and many more applications are anticipated. A \$30.00 filing fee to cover the state cost of administering the program is required for each well determination application. In addition, a FERC form and Pennsylvania forms must be completed and submitted along with geologic, engineering, and production data to support the requested classification.

Figure 32 lists the actions taken by the staff in making well-classification determinations for the year of 1979.

Figure 32. Well-classification determinations made under the Natural Gas Policy Act

<i>No. of applications</i>	<i>Category</i>	<i>Approved</i>	<i>Disapproved</i>
2	102	2	0
313	103	284	29
193	108	193	0

SUMMARIZED RECORDS OF REPORTED DEEP WELLS IN 1979 THAT PENETRATED ROCKS OF MIDDLE DEVONIAN OR OLDER AGE

The information in Figure 33 has been compiled mainly from drillers' logs, location plats, and geophysical logs received from the Oil and Gas Regulatory Division. Other sources are Petroleum Information Corporation (PI), and personal communications with oil and gas operators. Wells are filed with the Oil and Gas Regulatory Division by permit numbers. The Oil and Gas Geology Division assigns a file number which appears on the Survey's published and open-file maps.

A single asterisk appearing on a record indicates that all formation tops and total depths were picked from a geophysical log. A record without an asterisk means that the formation tops and total depths are from the driller's log. A double asterisk precedes the 7-1/2-minute-quadrangle name and location. The tables are listed alphabetically by county and by name of well.

Figure 33. Summarized records of reported deep wells in 1979 that penetrated rocks of Middle Devonian or older age

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Bedford 20058	Bedford 20057	Bedford 20056	Clarion 20751	Clearfield 20917	Clearfield 20827	Clinton 20198	Crawford 20560	Crawford 20561	Crawford 20574
NAME OF WELL	Jack E. Colledge #1	G. & S. Hamilton #1	David C. Trivette #1	North Penn Gas #7	Rachel Garland #1A	Alice Pollok #1A	PA Dept. Forest & Waters TR #3	James & Helen Anderson #5	James & Helen Anderson #3	James & Helen Anderson #5	George & Lois Bancroft #1
OPERATOR	Consolidated Gas Supply Corp. WH-1702	Adobe Oil & Gas Corporation	Columbia Gas Transmission Corp	Peoples Natural Gas Company	Texaco, Inc.	Consolidated Gas Supply Corp.	Consolidated Gas Supply Corp.	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company
TOWNSHIP	E. Providence	Lincoln	Mam	Farmington	Boggs	Union	Leidy	Athens	Athens	Athens	Athens
QUADRANGLE & MAP NUMBER	Broad Top G 3 **Wells Tannery	Bedford B 5 **Ogletown	Paw Paw A 6 **Artemas	Tionesta F 2 **Tylersburg	Houtzdale C 13 **Wallacetown	Penfield H 290 **Luthersburg	Lenovo West 231 **Tamarack	Townville C 5 **Centerville	Union City I 36 **Lake Canadota	Union City I 36 **Centerville	Townville A 10 **Centerville
LATITUDE	12,950 ft. S 40°05'00"	8,900 ft. S 40°15'00"	3,800 ft. S 39°45'00"	6,640 ft. S 41°25'00"	7,450 ft. S 40°57'30"	3,460 ft. S 41°05'00"	7,750 ft. S 41°27'30"	5,650 ft. S 41°45'00"	10,450 ft. S 41°47'30"	10,450 ft. S 41°47'30"	2,500 ft. S 41°45'00"
LONGITUDE	9,375 ft. W 78°12'30"	2,000 ft. W 78°37'30"	4,400 ft. W 78°25'00"	4,350 ft. W 79°15'00"	7,400 ft. W 78°17'30"	11,274 ft. W 78°37'30"	3,900 ft. W 77°50'00"	9,900 ft. W 79°45'00"	6,850 ft. W 79°45'00"	6,850 ft. W 79°45'00"	5,600 ft. W 79°50'00"
DATE COMPLETED	3-31-79	7-12-78	7-19-78	4-17-79	6-25-79	6-24-78	4-6-79	1-10-79	1-30-79	1-30-79	3-27-79
ELEVATION	1437 KB	1825 GR	1143 GR	1637 KB	2117 KB	1874 KB	1839 GR	1419 KB	1581 KB	1581 KB	1596 KB
TULLY	Mahantango Fm-5145-	*5315-	3702-	*5047-	7070-	*6502-	*5676-	*3186-	*3316-	*3316-	*3304-
ONONDAGA		6364-	5519-5545	5384-	7166-	7176- SG	6452	3420-	3551-	3551-	3532-
CHERT		6425-						3616			
ORISKANY		6459-	5705-5927		8100 Gas 88100-8105	7233-	6468-	Absent	Absent	Absent	Absent
HELDERBERG		6525-	5927-	5168-		7239-					
KEYSER-BASS ISLAND SALINA				5492-			3808-				
GUELPH-LOCKPORT BLACK WATER				6544-							
CLINTON											
IRONDEQUOIT											
MEDINA WHIRLPOOL				7066-					4614-	4740-	4720-
QUEENSTON				7240-					4663- Gas 4828-Gas	4790- Gas 48950-4893 4947-Gas	4769- Gas 48806-48865 4926-Gas
TOTAL DEPTH	7853	6585	5927	7316	8180	7239	6600	4990	5085	5085	5088
DEEPEST FORMATION REACHED	Mahantango	Helderberg	Helderberg	Queenston	Oriskany	Helderberg	Oriskany	Queenston	Queenston	Queenston	Queenston
RESULT	Gander Run Shale Member #7/8/3 Dry and abandoned new field wildcat	Dry and abandoned new field wildcat	Dry development well Artemas field Artemas pool	Dry and abandoned deeper pool test Leeper Field	120 Mcf AF 900 psi/48 hrs. development West Decatur Field	Dry and abandoned development Rockton pool Panxutaway-Oriskany Field	75,431 Mcf/gpd 1,410 psi/24 hrs. gas storage service well	3,000 Mcf AF 3,325 psi/72 hrs. development Athens Field	7,898 Mcf AF 1,350 psi/72 hrs. new pool discovery Brinstone pool Athens Field	150 Mcf AF 1,340 psi/72 hrs. extension Potash Run pool Athens Field	150 Mcf AF 1,340 psi/72 hrs. extension Potash Run pool Athens Field

Figure 33: (Continued)

COUNTY	Permit Number	Crawford 20580	Crawford 20575	Crawford 20609	Crawford 20565	Crawford 20588	Crawford 20510	Crawford 20590	Crawford 20628	Crawford 20559	Crawford 20576
NAME OF WELL	George Clark #1	Troy C. Ehrhart #1	Joseph Gajdowski #1	Leota Hinebaugh #6	Lee A. Hopkins #1	Nick Kats Tas #2	Joseph & Helen Kleinfert #1	Wilton Payne #2	Ernest & Valerie Post #1	Jack M. Preston #1	
OPERATOR	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company	Flanigan Bros.	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company	Meridian Oil & Gas Enterprises	B & G Gas Company	Flanigan Bros.	Wainoco Oil & Gas Company	Wainoco Oil & Gas Company	
TOWNSHIP	Athens	Athens	Cussewago	Athens	Rome	Sumner #1	Spring	Athens	Athens	Athens	
QUADRANGLE & MAP NUMBER	Townville C 6 **Centerville	Union City I 37 **Lake Canadota	Cambridge Spgs G42 **Edinboro South	Union City I 35 **Lake Canadota	Corry H 43 **Spartansburg	Linesville C 67 **Hammonslburg	Girard E 477 **Comeauville	Girard F 479 **Comeauville	Townville C 8 **Centerville	Union City I 38 **Lake Canadota	
LATITUDE	2,950 ft. S 41°45'00"	10,850 ft. S 41°47'30"	2,600 ft. S 41°47'30"	14,300 ft. S 41°47'30"	6,650 ft. S 41°47'30"	7,560 ft. S 41°45'00"	11,650 ft. S 41°52'30"	13,850 ft. S 41°52'30"	9,250 ft. S 41°45'00"	7,850 ft. S 41°47'30"	
LONGITUDE	11,200 ft. W 79°45'00"	4,950 ft. W 79°47'30"	4,450 ft. W 80°12'30"	3,200 ft. W 79°47'30"	7,150 ft. W 79°37'30"	6,900 ft. W 80°17'30"	3,450 ft. W 80°20'00"	9,350 ft. W 80°17'30"	4,250 ft. W 79°47'30"	8,150 ft. W 79°45'00"	
DATE COMPLETED	5-27-79	4-26-79	10-1-79	3-1-79	6-27-79	11-30-77	7-21-79	10-5-79	12-23-78	5-5-79	
ELEVATION	1601 KB	1559 KB	1139 DF	1611 KB	1611 KB	1348 KB	1139 OF	1164 OF	1626 KB	1541 KB	
TULLY	*3361-	*3210-		*3342-	*3436-3528		*2126-2164		*3414-3560	*3224-3300	
ONONDAGA	3594-	3443-		3580-	3688-4098	*2786-	2306-	2546	3640-	3456-	
CHERT									3920	3890	
ONISKANY	Absent	Absent	Absent	Absent	Absent	Absent		Absent	Absent	Absent	
HELOERBERG			*3650-3724								
KEYSER-BASS ISLAND								2552-2622			
S'CLINA					4098-4466			2622-3175			
G. ELPH-LOCKPORT											
BLACK WATER											3890-4244
C. INTON	4714-4771	4554-4610				3712-		3175-3410			
IRONDEQUOIT	4771-	4610-	3724-	4750-4802	4466-4876	4060-		3410-3511		4592-4850	
MEDINA	4822-	4664-	3780-	4802-4914	4876-4934	4085-		3511-3542	*3550-	4650-4702	
WHIRLPOOL	Gas 04030-4994	Gas 04709-4828	Gas 03820-3850	Gas 04821-4891	Gas 04934-5052	Gas 04160-4178		3542-	4520-	4702-	
	4980-	4820-4834	3921-3942	4958-4976 Gas	5084-5104 Gas	4271-		Gas 03632-3674	Gas 04975-5018	Gas 04735-4867	
QUEENSTON	5000-5166	4834-4902	3942-	4976-	5104-5260	4277-		1634-Cabot Rd	5074-5090	4860-4870	
TOTAL DEPTH	5166	4902	3957	5090	5260	4315		3718	5090-5182	4870-4890	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Medina	Queenston	5182	4890	
RESULT	3,180 Mcf AF 1,325 psi/72 hrs. development Athens field	2,800 Mcf AF 1,300 psi/72 hrs. development Athens field Brimstone pool	300 Mcf AF 1,100 psi/10 days development Kastle pool Comeau field	4,360 Mcf AF 1,350 psi/72 hrs. extension Brimstone pool Athens field	198 Mcf AF 1,420 psi/72 hrs. Deeper pool test Hatchtown pool Church Run field	500 Mcf AF 1,020 psi/13 days development Indian Springs pool Comeau field	1,800 Mcf AF 1,050 psi/13 days extension Lundy's Lane pool Comeau field	unknown 1,050 psi/10 days development Lundy's Lane pool Comeau field	839 Mcf AF 1,410 psi/48 hrs. development Athens field	6,023 Mcf AF 1,325 psi/72 hrs. development Brimstone pool Athens field	

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Crawford 20567	Crawford 20566	Erie 20734	Erie 20641	Erie 20645	Erie 20601	Erie 20715	Erie 20671	Erie 20874	Erie 20789
NAME OF WELL	Scott J. Preston #7	Orle & Fliste Watson #2	A. Elmer Allen #1	William Allen #1	Robert Allison #1	Carl Anderson #1	Robert Anderson #1-B	John Archer #B	James D. Baker #1	H. Barnett #1	
OPERATOR	Hainoco Oil & Gas Company	Hainoco Oil & Gas Company	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	
TOWNSHIP	Athens	Steuben	North East	North East	Harborcreek	Harborcreek	North East	Harborcreek	Greenfield	Greenfield	
QUADRANGLE & MAP NUMBER	Townville B 7 **Centerville	Townville C 9 **Centerville	North East B 188 **Harborcreek	North East B 172 **North East	North East A 158 **Harborcreek	North East D 141 **Harborcreek	North East C 189 **North East	North East B 183 **Harborcreek	North East E 234 **North East	North East E 228 **Harborcreek	
LATITUDE	10,900 ft. S 41°45'00"	8,500 ft. S 41°45'00"	8,250 ft. S 42°12'30"	1,025 ft. S 42°12'30"	800 ft. S 42°12'30"	11,450 ft. S 42°10'00"	11,450 ft. S 42°12'30"	750 ft. S 42°12'30"	11,400 ft. S 42°10'00"	11,850 ft. S 42°10'00"	
LONGITUDE	4,650 ft. W 79°50'00"	7,850 ft. W 79°45'00"	2,450 ft. W 79°52'30"	10,000 ft. W 79°50'00"	3,950 ft. W 79°55'00"	8,150 ft. W 79°55'00"	7,150 ft. W 79°47'30"	7,500 ft. W 79°52'30"	10,700 ft. W 79°50'00"	4,700 ft. W 79°52'30"	
DATE COMPLETED	3-18-79	1-22-79	4-27-79	12-17-78	11-24-78	10-10-78	5-13-79	1-14-79	10-4-79	9-11-79	
ELEVATION	1291 KB	1366 KB	834 OF	764 KB	670 KB	1030 KB	1269 KB	754 KB	1490 OF	1392 GR	
TULLY	*3034-	*3174-	*1314-	*1211-	*1090-	*1614-	*1812-	*1161-	*2100-	*2006-	
ONONDAGA LIMESTONE	3264-	3408-	1542-	1431-	1311-	1838-	2032-	1381-	2326-	2237-	
CHERT	3706	3640	1758	1580	1560	2092	2261	1633			
ORISKANY	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	
HELDERBERG	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	
KEYSER-BASS ISLAND											
SALINA	3706-4080	3800-4182	1758-1861 1861-1966 2245-	1680-1784 1784-1831 2135-	1560-1664 1664-1705 2014-	2092-2211 2211-2263 2565-	2261-2392 2392-2432 2752-	1633-1736 1736-	2580-2656 2700-	2488- 2587-	
GUELPH-LOCKPORT BLACK WATER			2508	2394	2271	2830	3000	2091-	3058-	2959-	
CLINTON	4430-4480		2508-2560	2394-2445	2271-2323	2830-2880	3000-3070	2352-2404	3314-3364	3214-	
IRONDEQUOIT	4480-	4617-	2560-2605	2445-2484	2323-2360	2880-2925	3070-3102	2404-2447	3364-	3268-	
MEDINA	4532-	4666-	2605-	2484-	2360-	2925-	3102-	2447-	3390-	3295-	
WHIRLPOOL	Gas 04574-4651 4694-4716 Gas	Gas 04743-4783 4828-4844 Gas	Gas 02607-2708 2730- Gas	Gas 02506-2598 2616- Gas	Gas 02366-2468 2498-2519 Gas	Gas 02325-2997 3052- Gas	Gas 03120-3207 3239- Gas	Gas 03421-3513 2574- Gas	Gas 03421-3513 3544- Gas	Gas 03317-3413 3448- Gas	
QUEENSTON	4716-	4844-	2765-	2636-	2519-	3074-	3257-	2596-	3558-	3460-	
TOTAL DEPTH	4820	4895	2840	2709	2583	3135	3363	2680	3646	3551	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	540 Mcf AF RP not given new pool Potash Run pool Athens field	830 Mcf AF 1,410 psi/48 hrs. development Athens field	891 Mcf AF 705 psi/10 days development Burgess pool North East field	410 Mcf AF 710 psi/10 days development Orchard Beach North East field	782 Mcf AF 735 psi/10 days development Harborcreek pool Erie field	35 Mcf AF 749 psi/10 days development Harborcreek pool Erie field	2,800 Mcf AF 915 psi/10 days development Orchard Beach North East field	958 Mcf AF 730 psi/10 days development Burgess pool North East field	149 Mcf AF 1,000 psi/10 days development Burgess pool North East field	212 Mcf AF 1,040 psi/10 days development Hornby pool North East field	

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20650	Erie 20637	Erie 20753	Erie 20864	Erie 20819	Erie 20793	Erie 20799	Erie 20806	Erie 20718	Erie 20708
N:ME OF WELL		Theodore Bauer #3	Carl Beckman #3A	Carl H. Beebe #1	Carl Beebe #2	Carl Bemis #1	Carl Bemis #2	G. & I. Bindley #1	Genevieve Blair #1	George Blasko #1	George Blasko #2
OPERATOR		Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Vineyard Oil & Gas Company	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP		Harborcreek	Harborcreek	Greenfield	Greenfield	Greenfield	Greenfield	North East	Greenfield	Harborcreek	Harborcreek
QUADRANGLE & MAP NUMBER		North East D 168 **Harborcreek	North East E 145 **Harborcreek	North East E 212 **Harborcreek	North East E 233 **Harborcreek	North East E 210 **North East	North East E 222 **North East	North East B 216 **North East	North East E 177 **Hattsbury	North East D 185 **Hammett	North East D 203 **Hammett
LATITUDE		4,500 ft. S 42°10'00"	1,450 ft. S 42°10'00"	9,250 ft. S 42°10'00"	10,100 ft. S 42°10'00"	6,900 ft. S 42°10'00"	7,500 ft. S 42°10'00"	650 ft. S 42°12'30"	2,050 ft. S 42°07'30"	3,950 ft. S 42°07'30"	6,100 ft. S 42°07'30"
LONGITUDE		6,100 ft. W 79°55'00"	10,300 ft. W 79°52'30"	3,300 ft. W 79°52'30"	5,100 ft. W 79°52'30"	11,050 ft. W 79°50'00"	9,150 ft. W 79°50'00"	5,500 ft. W 79°50'00"	7,550 ft. W 79°50'00"	5,550 ft. W 79°55'00"	5,600 ft. W 79°55'00"
DATE COMPLETED		12-14-78	11-3-78	7-18-79	9-18-73	7-1-79	6-23-79	6-30-79	11-23-78	3-27-79	4-3-79
ELEVATION		864 KB	894 KB	1380 GR	1380 DF	1400 KB	1405 GR	788 DF	1460 KB	1295 KB	1325 KB
TULLY		*1403-	*1422-	*1976-	*1960-	*1980-	*2007-	*1280-	*2133-	*1897-	*1928-
ONONDAGA LIMESTONE		1624-	1649-	2206-	2194-	2204-	2228- Gas	1445-	2360-	2129-	2162-
CHERT											
ONISKANY		Absent	Absent	Absent	Absent	2439-2460		Absent	Absent	Absent	Absent
HELDERBERG		Absent	Absent	Absent	Absent	Absent		Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND		1973-2184	1900-1988	2449-2570	2436-	2460-		1695-1845	2602-2720	2366-2517	2356-
SALINA		2184-	1998-	2570-	2552-	2566-		1845-	2720-	2517-	2546-
GUELPH-LOCKPORT BLACK WATER		2344-	2359-	2931-	2918-	2929-		2231-	3096-	2878-	2909-
CANTON		2605-2660	2621-2672	3187-3243	3176-3228	3196-3238		2411	3362-3403	3138-3183	3169-3220
IRONDEDUOIT		2660-2707	2672-2718	3243-	3228-	3238-3284		2466-2483	3403-3448	3183-	3220-3265
MEDINA WHIRLPOOL		2707- Gas 2832-2849 Gas	2718- Gas 2844-2862 Gas	3265- Gas 3415-3435 Gas	3253- Gas 3425-3437 Gas 3430-3420 Gas	3284- Gas 3412-3435 Gas		2483- Gas 2635-2658 Gas	3448- Gas 3582- Gas	3214- Gas 3362- Gas	3265- Gas 3394-
QUEENSTON		2849-	2862-	3435-	3420-	3435-		2658-	3598-	3382-	3416-
TOTAL DEPTH		2956	2946	3516	3489	3525	2410	2720	3673	3469	3502
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Onondaga	Queenston	Queenston	Queenston	Queenston
RESULT		14 Mcf AF 680 psi/10 days development Harborcreek pool Erie field	60 Mcf AF 770 psi/10 days development Burgess pool North East field	782 Mcf AF 1,010 psi/10 days development Hornby pool North East field	551 Mcf AF 900 psi/10 days development Burgess pool North East field	1,200 Mcf AF 950 psi/10 days development Burgess pool North East field	11,400 Mcf AF 816 psi/10 days development Onondaga shallow pool discovery Delhill Corners pool, North East field	10,120 Mcf AF 850 psi/5 days development Orchar Beach pool North East field	16 Mcf AF 995 psi/10 days development Hornby pool North East field	1,500 Mcf AF 995 psi/10 days extension Harborcreek pool Erie field	473 Mcf AF 1,030 psi/10 days development Harborcreek pool Erie field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Erie 20561	Erie 20603	Erie 20663	Erie 20830	Erie 20758	Erie 20639	Erie 20685	Erie 20630	Erie 20805	Erie 20700
NAME OF WELL		Leo Bitley #1	C. & H. Boyd #1	C. & H. Boyd #2	C. & H. Boyd #3	Harry Bowser #1	Robert Grace #1	Richard Brunner #1	Donald Bucheral #1	Herbert Burkett #1	Clyde Burnham #3
OPERATOR		Envirogas, Inc	N.E.A. Cross Co.	N.E.A. Cross Co.	N.E.A. Cross Co.	Envirogas, Inc	Robert H. Brace	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP		Greenfield	LeBoeuf	LeBoeuf	LeBoeuf	North East	Waterford	Greene	North East	North East	North East
QUADRANGLE & MAP NUMBER		North East E 150 **Harborscreek	Union City 0. 25 **Waterford	Union City 0. 30 **Waterford	Union City 0. 40 **Waterford	North East B 192 **Harborscreek	Union City A 28 **Waterford	North East G 200 **Hammett	North East C 144 **North East	North East E 223 **North East	North East B 201 **North East
LATITUDE		13.150 ft. S 42°10'00"	7.500 ft. S 41°55'00"	8.750 ft. S 41°55'00"	8.850 ft. S 41°55'00"	1.150 ft. S 42°12'30"	12.900 ft. S 41°57'30"	9.350 ft. S 42°05'00"	6.100 ft. S 42°15'00"	1.200 ft. S 42°10'00"	3.850 ft. S 42°12'30"
LONGITUDE		6.450 ft. W 79°52'30"	6.450 ft. W 79°55'00"	5.700 ft. W 79°55'00"	7.550 ft. W 79°55'00"	2.600 ft. W 79°52'30"	8.750 ft. W 79°55'00"	7.050 ft. W 79°57'30"	7.950 ft. W 79°47'30"	0.850 ft. W 79°50'00"	5.500 ft. W 79°50'00"
DATE COMPLETED		11-14-78	9-12-78	1-7-79	7-25-79	5-10-79	11-7-78	1-30-79	11-11-78	8-7-79	3-31-79
ELEVATION		1340 KB	1233 KB	1234 KB	1224 DF	754 KB	1228 KB	1370 KB	704 KB	1270 GR	844 KB
TULLY		*1960-	*2366-	*2383-	*2370-	*1176-	*2204-	*2061-	*1110-	*1830-	*1306-
ONONAGA	LIMESTONE	2192-	2598-	2610-	2606-	1400-	2430-	2290-	1334-	2052-	1529-
CHERT						-1659					
ORISKANY		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
HELDERBERG		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND		2430-2552	2829-2902	2850-2964	1659-1754	2682-2798	2543-2683	2543-2683	1578-1668	2296-	1776-1893
SALINA		2552-	2902-3429	2964-3494	3294-3374	1754-	2798-3314	2683-	1668-	2416-	1893-
GUELPH-LOCKPORT		2915-	3429-	3494-	3374-	2106-	3314-	3078-	2020-	2765-	2237-
BLACK WATER											
CLINTON		3182-3228	3676-3782	3694-3804	3522-3634	3522-3634	3346-3393	3346-3393	2282-2334	3038-3074	2496-2547
IRONDEQUOIT		3228-3276	3782-3812	3804-3834	3778-3302	2416-2459	3634-	3393-3442	2334-2384	3074-	2547-2590
MEDINA		3276-	3812-	3834-	3802-	2459-	3664-	3442-	2384-	3098-	2590-
WHIRLPOOL		Gas 03282-3366	Gas 03877-3985	Gas 03387-3913	Gas 03856-3912	Gas 02461-2552	Gas 03692-3778	Gas 03441-3587	Gas 02386-2472	Gas 03126-3224	Gas 02603-2690
		3400- Gas	3978-3987	4000-4011	3970-	2594- Gas	3830- Gas	3568-3589	2500-2521 Gas	3254-3270 Gas	2718-2739 Gas
QUEENSTON		3422-	3987-	4011-	3982-	2606-	3841-	3589-	2521-	3270-	2739-
TOTAL DEPTH		3490	4065	4078	4033	2683	3928	3655	2604	3340	2852
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		212 Mcf AF 982 psi/10 days development Hornby pool North East field	2,400 Mcf AF 1,160 psi/4 days development Waterford pool Erie field	2,600 Mcf AF 1,725 psi/4 days development Waterford pool Erie field	2,100 Mcf AF 1,110 psi/10 days development Waterford pool Erie field	259 Mcf AF 660 psi/4 days development Burgess pool North East field	1,550 Mcf AF 1,265 psi/4 days development Waterford pool Erie field	1,550 Mcf AF 1,265 psi/4 days development Waterford pool Erie field	259 Mcf AF 693 psi/10 days development Orchard Beach pool North East field	1,500 Mcf AF 930 psi/10 days development Burgess pool North East field	366 Mcf AF 785 psi/10 days development Orchard Beach pool North East field

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20740	Erie 20574	Erie 20866	Erie 20652	Erie 20747	Erie 20569	Erie 20892	Erie 20834	Erie 20751	Erie 20746
NAME OF WELL		Clyde Burnham #5	J. Burns #2	Delmas Chesley #1	Raleigh Chesley #1	Stanley Chwatek #1	Daniel Coletta #1	Lyle Cook #1	Cornish Lumber Company #1	Cubbon Lumber #1	Douglas Devore #1
OPERATOR		Envirogas, Inc	Minnesota Oil & Gas Company	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	N. E. A. Cross Company	Doran and Associates, Inc	Envirogas, Inc
TOWNSHIP		North East	Elk Creek	Greenfield	Greenfield	Greenfield	North East	North East	LeBeauf	Wayne	North East
QUADRANGLE & MAP NUMBER		North East B 230 **North East	Girard E 476 **Comeauville	North East F 164 **Nattsburg	North East F 163 **Nattsburg	North East E 226 **North East	North East B 139 **Harborscreek	North East B 186 **North East	Union City D 43 **Waterford	Corry A 44 **Corry	North East B 225 **Harborscreek
LATITUDE		9,600 ft. S 42°12'30"	2,075 ft. S 41°52'30"	10,250 ft. S 42°07'30"	11,550 ft. S 42°07'30"	5,800 ft. S 42°10'00"	9,600 ft. S 42°12'30"	7,200 ft. S 42°12'30"	7,300 ft. S 41°57'30"	7,300 ft. S 41°57'30"	13,100 ft. S 42°15'00"
LONGITUDE		3,250 ft. W 80°20'00"	1,500 ft. W 80°20'00"	6,350 ft. W 79°47'30"	7,550 ft. W 79°47'30"	9,000 ft. W 79°50'00"	4,550 ft. W 79°52'30"	11,100 ft. W 79°50'00"	5,000 ft. W 79°55'00"	4,870 ft. W 79°49'00"	3,200 ft. W 79°52'30"
DATE COMPLETED		10-26-79	7-27-78	12-19-78	12-7-78	7-30-79	10-6-78	5-3-79	9-8-79	6-19-79	6-14-79
ELEVATION		1104 DF	1083 KB	1410 KB	1410 KB	1380 GR	835 KB	834 DF	1199 DF	1488 DF	750 GR
TITLE		*1600-	*2000-	*2173-	*2179-	1978-	*1328-	*1323-	*2340-		*1146-
ONONDAGA LIMESTONE		1822-	2192-	2407-	2404-	2190- Gas	1552-	1553-	2566-		1366-
CHERT											
ORISKANY		Absent	2434-2441	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Helderberg		Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND		2077-	2441-2518	2629-	2642-	1784-	1800-	1800-	1623-1716		1623-1716
SILINA		2182-	2518-3046	2744-	2754-	1904-	1903-	1903-	3320-		1716-
GUELPH-LOCKPORT		2534-	3046-	3118-	3128-	2259-	2250-	2250-	3374-		2070-
BLACK WATER											
CANTON		2795-2850	3284-	3381-	3390-	2516-	2514	2514	2332-2382		2332-2382
IRONDEQUOI		2850-	3384-	3430-	3445-	2571-	2565-	2565-	3766-		2382-2407
MEDINA		2874-	3412-	3458-	3492-	2596-	2596-	2610-	3780-		2407-
WHIRLPOOL		Gas 28901-2987	Gas 34433-3498	Gas 34045-3576	Gas 33501-3592	Gas 2620-2720	Gas 2620-2720	Gas 2610-2696	Gas 83944-3912		Gas 24030-2570
		3022- Gas	3589-	3606- Gas	3622- Gas	2732- Gas	2732- Gas	2732- Gas	3974-		2555-
OLEENSTON		3040-	3589-	3627-	3641-	2765-	2765-	2752-	3974-		2576-
TOTAL DEPTH		3123	3640	3715	3727	2425	2851	2832	4041		2650
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Onondaga	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		1,800 Mcf AF 900 psi/10 days Orchard Beach North East field	1,450 Mcf AF 980 psi/4 days development Lundin line Comeauville	183 Mcf AF 1,015 psi development Little Rock pool North East field	551 Mcf AF 1,055 psi development Little Rock pool North East field	6,900 Mcf AF 770 psi/10 days development Delhi Corners North East field	366 Mcf AF 740 psi/10 days development Burgess pool North East field	1,400 Mcf AF 760 psi/10 days development Burgess pool North East field	2,100 Mcf AF 1,110 psi/10 days development Waterford pool Erie field	385 Mcf AF 990 psi/72 hrs. development disc pool Blair field Spencer Creek Corry field	650 Mcf AF 760 psi/10 days development disc pool Blair field Spencer Creek Corry field

SUMMARIZED RECORDS OF DEEP WELLS

COUNTY	Permit Number	Erie 20649	Erie 20792	Erie 20558	Erie 20731	Erie 20800	Erie 20704	Erie 20732	Erie 20778	Erie 20833	Erie 20790
NAME OF WELL	Alvin Eliason #1	Frank Eret #1	Robert Evans #1	O. Falkowski #1	John Fldorra #1	James Fiske #1	James Fiske #1	James Fiske #2	Donald Fuller #1	Lawrence Gehres #1	Thomas Graczyk #2
OPERATOR	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Greenfield	Greene	Envirogas, Inc	Envirogas, Inc	N.E.A. Cross Company	Envirogas, Inc
TOWNSHIP	Summit	Greenfield	Harborcreek	Harborcreek	Greenfield	North East E 232	North East G 202	Greene	North East	LeBoeuf	Greenfield
QUADRANGLE & MAP NUMBER	Erie I 138 **Erie South	North East E 221 **Harborcreek	North East O 149 **Hammett	North East O 199 **Hammett	North East E 232 **Harborcreek	North East G 202 **Hammett	North East G 191 **Hammett	North East G 191 **Hammett	North East E 220 **North East	Union City E 42 **Waterford	North East E 213 **Hammett
LATITUDE	12,850 ft. S 42°05'00"	10,560 ft. S 42°10'00"	1,150 ft. S 42°07'30"	2,300 ft. S 42°07'30"	6,560 ft. S 42°10'00"	13,500 ft. S 42°05'00"	13,500 ft. S 42°05'00"	13,560 ft. S 42°05'00"	2,500 ft. S 42°10'00"	7,400 ft. S; 41°55'00"	5,700 ft. S; 42°07'30"
LONGITUDE	1,000 ft. W 80°00'00"	1,950 ft. W 79°52'30"	950 ft. W 79°57'30"	9,200 ft. W 79°55'03"	5,950 ft. W 79°52'30"	11,100 ft. W 79°57'30"	11,100 ft. W 79°57'30"	11,100 ft. W 79°57'30"	10,550 ft. W 79°50'00"	5,100 ft. W 79°52'30"	2,650 ft. W 79°52'30"
DATE COMPLETED	2-19-79	6-18-79	10-27-78	3-21-73	10-31-79	3-7-79	3-20-79	3-20-79	5-20-79	8-25-79	7-11-79
ELEVATION	1320 KB	1435 GR	1160 KB	1220 K3	1270 DF	1360 KB	1354 KB	1285 KB	1285 KB	1239 DF	1515 KB
TULLY	*1990-	*2044-	*1727-	*1801-	*1835-	*2017-	*2018-	*1836-	*2418-	*2170-	
ONONDAGA LIMESTONE CHERT	2220-	2273-	1954-	2030-	2048-Boss Blanc 2245-2280	2244-	2248-	2063-	2660-	2396-	
ORISKANY	Absent	2515-2528	Absent	Absent	Absent	2500-2512 Gas @2502-2506	2503-2516	2278-2308	Absent	Absent	Absent
HELDERBERG	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND	2490-2618	2528-2578	2204-2324	2299-2408	2280-2362	2512-2580	2516-2656	2308-	2308-	2641-2768	
SALINA	2618-2671	2633-2686	2324-2371	2408-2460	2416-2467	2416-2467	2656-2702	2419-	3368-3418	2768-	
GUELPH-LOCKPORT BLACK WATER	3003-	3001-	2688-	2770-	2782-		3064-	2777-	3418-	3132-	
CLINTON	3274-3325	3261-3311	2948-3002	3029-3079	3050-3086		3312-3329	3039-3090	3836-3862	3388-3443	
IRONDEQUOIT	3325-3353	3311-3348	3002-3030	3079-3108	3086-		3329-3408	3090-3121	3836-3862	3443-3468	
MEDINA WHIRLPOOL	3353-	3348-	3030-	3108-	3111-		3408-	3121-	3862-	3468-	
QUEENSTON	Gas (83374-3466) 3514 - Gas	Gas (83359-3459) 3484 - Gas	Gas (83048-3141) 3177 - Gas	Gas (83130-3225) 3254 - Gas	Gas (83137-3224) 3262 - Gas	Gas (83430-3512) 3566 - Gas	Gas (83064-3912) 4032-4046 Gas	Gas (83140-3221) 3266-3280 Gas	Gas (83140-3221) 3266-3280 Gas	Gas (83476-3580) 3625-3638 Gas	
TOTAL DEPTH	3524-	3505-	3193-	3273-	3284-		3576-	3280-	4046-	3638-	
DEEPEST FORMATION REACHED	3591	3600	3248	3349	3340	Bass Island	2580	3665	3360	4095	3735
RESULT	1,700 Mcr AF 925 psi/10 days development Horbyl pool Goddard pool Erie field	551 Mcr AF 1,046 psi/10 days development Horbyl pool North East field	149 Mcr AF 844 psi/10 days development Attention Harborcreek pool Erie field	85 Mcr AF 765 psi/10 days development Harborcreek pool Erie field	1,800 Mcr AF 950 psi/10 days development Burgess pool North East field	Queenston	2,700 Mcr AF 810 psi/10 days development Oriskany Shallow pool discovery Barcos pool Erie field	Queenston	78 Mcr AF 816 psi/10 days development Burgess pool North East field	Queenston	2,000 Mcr AF 1,210 psi/10 days development New Ireland field
											3,800 Mcr AF 1,185 psi/10 days development Horbyl pool North East field

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20812	Erie 20688	Erie 20597	Erie 20691	Erie 20761	Erie 20586	Erie 20572	Erie 20654	Erie 20738	Erie 20640
NAME OF WELL		Webster Halloran #1	Harborcreek Twp. #1	Norman Hatch #1	Geraldine Hicks #1	Geraldine Hicks #1-A	Gary Hoover #1	John Johnson #1	Charles Johnston #1	R. Jones #1	Robert Jordan #1
OPERATOR		Hanley & Bird	Envirogas, Inc	Appalachian Energy, Inc.	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP		Venango	Harborcreek	Wayne	Fairview	Fairview	Harborcreek	Harborcreek	North East	North East	North East
QUADRANGLE & MAP NUMBER		North East H 217 **Hattsburg	North East D 184 **Harborcreek	Corty B 37 **Corry	Erie G 140 **Svanville	Erie G 141 **Svanville	North East D 140 **Harborcreek	North East D 170 **Harborcreek	North East B 161 **Harborcreek	North East B 211 **North East	North East C 207 **North East
LATITUDE		6,400 ft. S 42°05'00"	7,050 ft. S 42°10'00"	2,710 ft. S 42°00'00"	2,250 ft. S 42°02'30"	2,150 ft. S 42°02'30"	12,940 ft. S 42°10'00"	13,900 ft. S 42°10'00"	14,750 ft. S 42°15'00"	9,800 ft. S 42°12'30"	5,300 ft. S 42°16'25"
LONGITUDE		880 ft. W 79°50'00"	2,550 ft. W 79°57'30"	6,210 ft. W 79°37'30"	6,200 ft. W 80°12'30"	6,100 ft. W 80°12'30"	8,010 ft. W 79°55'00"	700 ft. W 79°57'30"	3,050 ft. W 79°52'30"	400 ft. W 79°50'00"	11,000 ft. W 79°45'00"
DATE COMPLETED		9-6-79	1-30-79	10-24-78	2-28-79	3-23-79	9-24-78	11-10-78	12-6-78	8-16-79	11-29-78
ELEVATION		1336 KB	814 KB	1764 DF	823 KB	823 KB	1069 KB	1015 KB	754 KB	1204 KB	604 DF
TRAIL			*1360-		*1378-	*1378-	*1669-	*1592-	*1159-	*1711-	* 915-
ONONDAGA	LIMESTONE	*2390-	1588-		1584-	1584-	1901-	1981-	1385-1633	1936-	1146-1349 Bois Blanc 1349-1398
CHERT											
ORISKANY		Absent	Absent		1049-1866	1049-1866	Absent	Absent	Absent	2179-2190	Absent
HFOERBERG		Absent	Absent		Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND			1835-1949		1866-1988	1866-1988	2161-2267	2069-2180	1633-1738	2190-	1398-1470
SALINA			1949-		1988-	1988-	2267-	2188-	1736-	2293-	1470-
GUELPH-LOCKPORT			2314-		2414-	2414-	2629-	2547-2812	2087-	2653-	1834-
BLACK WATER											
CANTON			2571-2622		2680-2726		2894-2942	2812-2866	2347-2399	2911-2966	2100-2147
IRONDEVOUIT		3443-	2622-2663		2726-		2942-2969	2866-2914	2399-2446	2966-	2147-
MEDINA		3460-	2663-	*4328-	2754-		2969-	2914-	2446-	2990-	2171-
WHIRLPOOL		Gas 03310-3626 3618-	Gas 02668-2750 2797- Gas	Gas 04381-4415 4468- Gas	2914-		Gas 03005-3080 3114- Gas	Gas 02916-3005 3040- Gas	Gas 03012-3106 3140-	Gas 02197-2275 2314-	Gas 02197-2275 2314-
QUEENSTON		3629-	2812-	4484-	2924-		3132-	3057-	2680-	3156-	2332-
TOTAL DEPTH		3656	2880	4582	2990	2465	3216	3121	2661	3238	2402
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Lockport	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		70 Mcf AF 950 psi/48 hrs. New pool discovery Half Moon pool	1,100 Mcf AF 715 psi/10 days development Harborcreek pool Erie field	465 Mcf AF 1,060 psi/72 hrs. development Brokenstraw field	Junked and abandoned development Fairview pool Erie field	Junked and abandoned development Fairview pool Erie field	78 Mcf AF 693 psi/10 days development Harborcreek pool Erie field	60 Mcf AF 770 psi/10 days development Harborcreek pool Erie field	449 Mcf AF 778 psi/10 days development Burgess pool North East field	958 Mcf AF 640 psi/10 days development Orchard Beach pool North East field	3,600 Mcf AF 655 psi/10 days development Orchard Beach pool North East field

COUNTY	Permit Number	Erie 20679	Erie 20669	Erie 20589	Erie 20632	Erie 20598	Erie 20754	Erie 20818	Erie 20772	Erie 20687	Erie 20557
NAME OF WELL	Edward Kearney #1	John Kobys #1	John Koehler #1	James Kolstee #1 (AE-29)	John Kolstee #1 (AE-31)	Gene Kovalski #1	Gene Kovalski #1	Gene Kovalski #2	Joseph Kovalski #1	John Kozlowski #1	Walter Kuhl #1
OPERATOR	Envirogas, Inc	B & G Gas Company	Envirogas, Inc	Appalachian Energy, Inc	Appalachian Energy, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP	Greene	Conneaut	Greene	Wayne	Wayne	Greenfield	Greenfield	Greenfield	Greenfield	Harborscreek	Greene
QUADRANGLE & MAP NUMBER	North East G 197 **Hammett	Girard E 478 **Conneautville	Erie I 136 **Erie South	Corry B 40 **Columbus	Corry B 38 **Corry	North East E 205 **Hammett	North East E 224 **Hammett	North East E 206 **Hammett	North East D 137 **Hammett	North East D 198 **Harborscreek	North East D 137 **Hammett
LATITUDE	8,875 ft. S 42°05'00"	8,550 ft. S 41°52'30"	9,650 ft. S 42°05'00"	4,400 ft. S 42°00'00"	5,310 ft. S 42°00'00"	2,050 ft. S 42°07'30"	950 ft. S 42°07'30"	350 ft. S 42°07'30"	5,750 ft. S 42°10'00"	9,250 ft. S 42°07'30"	9,250 ft. S 42°07'30"
LONGITUDE	5,650 ft. W 79°57'30"	6,450 ft. W 80°20'00"	400 ft. W 80°00'00"	7,500 ft. W 79°35'00"	3,150 ft. W 79°37'30"	2,000 ft. W 79°52'30"	200 ft. W 79°52'30"	1,950 ft. W 79°52'30"	9,650 ft. W 79°55'00"	3,100 ft. W 79°55'00"	3,100 ft. W 79°55'00"
DATE COMPLETED	1-13-79	12-24-78	8-31-78	11-25-70	10-10-78	4-18-79	8-16-79	6-11-79	2-1-79	8-14-78	8-14-78
ELEVATION	1340 KB	1114 OF	1410 KB	1442 KB	1799 OF	1480 KB	1465 GR	1490 KB	854 KB	1385 KB	1385 KB
TULLY	*2012-	*2086-	*2087-			*2118-	*2115-	*2113-	*1402-	*2036-	
ONONDAGA	LIMESTONE	2260-	2316-			2348-	2350-	2344-	1630-	2268-	
	CHERT										
ORISKANY	Absent	Absent	2572-2585 show			Absent	2605-	2588-2600	Absent	Absent	Absent
HELDERBERG	Absent	Absent	Absent			Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND	2490-	2592-	2585-2713			2549-2716	2605-2754	2600-	1875-1990	2460-2855	2460-2855
SALINA	2624-		2713-			2716-	2754-	2701-	1990-	2855-	2855-
GUELPH-LOCKPORT	3026-	3108-	3096-			3052-	3077-	3074-3338	2342-	3019-	3019-
BLACK WATER											
CLINTON	3290-3337	3353-3449	3345-3414			3333-3386	3342-3388	3338-3388	2602-	3285-3334	3285-3334
IRONDEQUOIT	3337-3381	3449-3479	3414-3441			3386-3414	3388-	3388-	2658-	3334-3390	3334-3390
MEDINA	3381-	3479-	3441-	*4040-	*4400-	3414-	3412-	3416-	2688-	3390-	3390-
WHIRLPOOL	Gas @3398-3533	Gas @3542-3612	Gas @3465-3569	Gas @4116-4146	Gas @4464-4473	Gas @3438-3510	Gas @3438-3510	Gas @3438-3510	Gas @3438-3510	Gas @3438-3510	Gas @3438-3510
	3523-3535	3654-3660	3595- Gas	4192- Gas	4526-	3562-3579	3563- Gas	3566-3579	2832-2848 Gas	2832-2848 Gas	3512- Gas
QUEENSTON	3535-	3660-	3616-	4210-	4539-	3579-	3581-	3579-	2848-	3530-	3530-
TOTAL DEPTH	3609	3688	3705	4323	4688	3663	3656	3665	2930	3606	3606
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	366 Mcf AF 1,000 psi discovery Goddard pool Erie field	957 Mcf AF 875 psi/28 days discovery Lundy's Lane pool Conneaut field	318 Mcf AF 962 psi/10 days discovery Goddard pool Erie field	615 Mcf AF 1,050 psi/72 hrs. discovery Brookfield field	700 Mcf AF 1,075 psi/72 hrs. discovery Brookfield field	420 Mcf AF 1,041 psi/10 days discovery North East field	782 Mcf AF 1,070 psi/10 days discovery North East field	1,200 Mcf AF 960 psi discovery North East field	55 Mcf AF 635 psi discovery Harborscreek pool Erie field	259 Mcf AF 920 psi/10 days discovery Kuhl pool Erie field	259 Mcf AF 920 psi/10 days discovery Kuhl pool Erie field

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20602	Erie 20621	Erie 20592	Erie 20706	Erie 20829	Erie 20735	Erie 20881	Erie 20798	Erie 20831	Erie 20636
NAME OF WELL	Lakeport Realty #1	Arthur Larson #2	North East B 142 **Harborecreek	Warren Lechtner #1	Ray Lyons #1	Thomas L. Mannarelli #1	George Mason #1	Helen McClure #1	Richard McIntosh, et al #1	George & Shirley McLaughlin #1	Richard Neeh #1
OPERATOR	Lakeport Realty	Envirogas, Inc	North East	Envirogas, Inc	Envirogas, Inc	N.E.A. Cross Company	Envirogas, Inc	Envirogas, Inc	Vineyard Oil & Gas Company	M.E.A. Cross Company	Envirogas, Inc
TOWNSHIP	City of Erie	North East	North East	North East	Greenfield	LeBoeuf	Girard	Greenfield	North East	LeBoeuf	North East
QUADRANGLE & MAP NUMBER	Erie E 137 **Erie South	North East B 142 **Harborecreek	North East O 153 **North East	North East E 194 **North East	Union City D 39 **Waterford	Union City D 39 **Waterford	Fairview I 5 **Fairview	North East E 229 **North East	North East B 214 **North East	Union City D 41 **Waterford	North East B 156 **North East
LATITUDE	4,450 ft. S 42°07'30"	6,450 ft. S 42°12'30"	9,100 ft. S 42°12'30"	4,900 ft. S 42°10'00"	9,650 ft. S 41°55'00"	9,650 ft. S 41°55'00"	2,250 ft. S 42°02'30"	8,750 ft. S 42°10'00"	15,100 ft. S 42°15'00"	14,100 ft. S 41°55'00"	1,700 ft. S 42°12'30"
LONGITUDE	8,700 ft. W 80°05'00"	1,450 ft. W 79°52'30"	6,800 ft. W 79°50'00"	10,550 ft. W 79°50'00"	3,950 ft. W 79°55'00"	3,950 ft. W 79°55'00"	650 ft. W 80°17'30"	10,600 ft. W 79°50'00"	4,200 ft. W 79°50'00"	6,350 ft. W 79°57'30"	6,800 ft. W 79°50'00"
DATE COMPLETED	9-25-78	10-14-78	11-14-78	7-13-79	7-31-79	6-5-79	6-5-79	10-10-79	6-26-79	7-27-79	11-23-78
ELEVATION	685 KB	805 KB	960 KB	1360 KB	1254 DF	690 GR	690 GR	1430 GR	794 KB	1194 DF	794 KB
TULLY	*1270-	*1276-	*1460-	*1932-	*2402-	*1218-	*1218-	*2031-	*1206-	*2396-	*1246-
ONONDAGA	LIMESTONE	1450-1674	1499-1733	2160-2410	2636-3388	1429-	2256-Bois Blanc 2450-2502	2256-Bois Blanc 2450-2502	1441-	2616-	1469-
CHERT											
ORISKANY	Absent	Absent	Absent	Absent	Absent	Absent	1703-1723	Absent	Absent	Absent	Absent
HELDERBERG	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND	1674-1818	1733-	1924-2034	2420-2521	2420-2521	1723-1886	2502-2585	2502-2585	1701-1852	1709-1822	1709-1822
SALINA	1818-1871	1845-	2034-2079	2521-2572	2521-2572	3388-3442	1886-	2608-2664	1852-	3342-	1867-
GUELPH-LOCKPORT	2250-	2204-	2396-2652	2884-	2884-	3442-	2252-	2980-	2245-	3376-	2174-
BLACK WATER											
CLINTON	2470-2502	2460-2514	2652-2706	3150-3195	3150-3195	3832-3856	2510-2559	3239-3294	2308-	2432-2486	2432-2486
IRONDEQUOIT	2502-2551	2514-	2706-2754	3195-3221	3195-3221	3832-3856	2559-	3294-	2470-	3786-	2486-
MEDINA	2551-	2550-	2754-	3224-	3224-	3856-	2590-	3321-	2489-	3806-	2528-
WHIRLPOOL	Gas @2554-2694	Gas @2563-2654	Gas @2759-2842	Gas @3248-3304	Gas @3248-3304	Gas @3394-3962	Gas @2599-2686	Gas @3343-3443	Gas @2519-2554	Gas @3854-3918	Gas @2537-2635
QUEENSTON	2697-	2709-	2898-	3384-	3366-3384 Gas	4030-4042	2740-2756 Gas	3471-3488 Gas	2635-	3988-3998	2652-
TOTAL DEPTH	2752	2785	2968	3478	4094	4042-	2756-	3488-	2652-	3998-	2674-
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	750 Mcf AF 720 psi/6 days development Charter Oak pool Erie field	1,750 Mcf AF 680 psi/10 days development Burgess pool North East	2,500 Mcf AF 764 psi/10 days development Burgess pool North East	259 Mcf AF 970 psi development Burgess pool North East	2,000 Mcf AF 1,150 psi/10 days development Waterford pool Erie field	2,000 Mcf AF 1,150 psi/10 days development Waterford pool Erie field	111 Mcf AF 830 psi/10 days New pool discovery Fairview	1,500 Mcf AF 1,025 psi/10 days development Burgess pool North East	390 Mcf AF 830 psi/5 days development Orchard Beach pool	2,300 Mcf AF 1,210 psi/10 days New field discovery M111 Village	2,900 Mcf AF 800 psi/10 days development Orchard Beach pool

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Erie 20693	Erie 20757	Erie 20455	Erie 20767	Erie 20773	Erie 20720	Erie 20777	Erie 20762	Erie 20717	Erie 20660
NAME OF WELL		X. Mehl #1	X. Mehl #2	Eugene & Ernestine Mitchell #1	Eugene & Ernestine Mitchell #2	William Mong #1	Leon Morton #2	Glenn Murphy #1	Alex Hietupski #1	John Noonan #1	Carl J. Norder #1
OPERATOR		Envirogas, Inc	Envirogas, Inc	Eugene & Ernestine Mitchell	Eugene & Ernestine Mitchell	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP		North East	North East	Waterford	Waterford	Greenfield	Wayne	North East	Greenfield	Green	Harbortcreek
QUADRANGLE & MAP NUMBER		North East B 187 **North East	North East B 227 **North East	Union City A 29 **Waterford	Union City A 44 **Waterford	North East E 231 **Harbortcreek	Union City C 45 **Union City	North East B 196 **North East	North East E 193 **Mattsburg	North East G 218 **Hannett	North East A 169 **Harbortcreek
LATITUDE		9,500 ft. S 42°12'30"	11,100 ft. S 42°12'30"	9,200 ft. S 41°57'30"	9,000 ft. S 41°57'30"	9,500 ft. S 42°10'00"	1,600 ft. S 42°00'00"	5,500 ft. S 42°12'30"	2,500 ft. S 42°07'30"	7,050 ft. S 40°05'00"	5,950 ft. S 42°12'30"
LONGITUDE		5,000 ft. W 79°50'00"	4,850 ft. W 79°50'00"	500 ft. W 79°57'30"	9,900 ft. W 79°55'00"	7,200 ft. W 79°52'30"	100 ft. W 79°45'00"	7,300 ft. W 79°50'00"	11,200 ft. W 79°50'00"	2,100 ft. W 79°57'30"	1,400 ft. W 79°55'00"
DATE COMPLETED		3-16-79	8-30-79	12-15-77	6-13-73	10-23-79	5-14-79	5-28-79	4-26-79	4-12-79	2-15-79
ELEVATION		1000 GR	1150 GR	1266 KB	1204 OF	1310 OF	1690 GR	860 KB	1460 FB	1305 GR	684 KB
TULLY		*1521-	*1677-			*1856-	*2691-	*1334-	*2120-	*2016-	*1131-
ONONDAGA	LIMESTONE	1745-	1908- Bois Blanc 2102-2153	2350-	2350-	2106- Bois Blanc 2299-2351	2932-	1556-	2351-	2250-	1348-
CHERT											
ORISKANY		Absent	Absent			Absent	3158-3180	Absent	Absent	2492-2506	Absent
HELDERBERG		Absent	Absent			Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND		1995-2098	2153-			2351-	3180-	1810-	2611-2704	2506-2635	1599-1699
SALINA		2098-	2266-			2461-	3303-	1916-	2704-	2635-	1699-
GUELPH-LOCKPORT		2450-	2612-			2828-	3770-	2256-	3073-	3010-	2056-
BLACK WATER											
CLINTON		2707-2762	2871-			3088-	4040-4092	2517-2568	3337-3384	3252-3317	2316-2368
IRONDEQUOIT		2762-2805	2924-			3144-	4092-4124	2568-	3384-3413	3317-3364	2368-2409
MEOLINA		2805-	2950-	3600- Gas	3580-	3171-	4124-	2513-	3413-	3361-	2409-
WHIRLPOOL	Gas 02809-2901	Gas 02972-3056	Gas 02972-3056	Gas 03655-3705	Gas 03655-3705	Gas 03201-3264	Gas 04126-4235	Gas 02615-2705	Gas 02435-3523	Gas 03365-3462	Gas 02423-2507
	2029-2953 Gas	3098- Gas	3098- Gas	3762-	3762-	33181- Gas	4278- Gas	2738- Gas	3554- Gas	3495-3514 Gas	2542- Gas
QUEENSTON		2953-	3116-	3769	3790-	3334-	4292-	2758-	3576-	3514-	2560-
TOTAL DEPTH		3030	3188	3850	3882	3427	4368	2845	3666	3583	2629
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		6,400 Mcf AF 785 psi development Burgess pool North East field	90 Mcf AF 790 psi/10 days development Burgess pool North East field	783 Mcf AF 1,200 psi/18 days development Waterford pool Erie field	200 Mcf AF 4,600 Mcf AF 1,200 psi/18 days development Waterford pool Erie field	410 Mcf AF 975 psi/10 days development Burgess pool North East field	551 Mcf AF 1,200 psi/10 days New field discovery Carter Hill field	4,000 Mcf AF 850 psi development Burgess pool North East field	518 Mcf AF 995 psi/10 days development Hornby pool North East field	212 Mcf AF 1,035 psi/10 days development Goddard pool Erie field	551 Mcf AF 750 psi/10 days development Harbortcreek pool Erie field

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20564	Erie 20702	Erie 20642	Erie 20622	Erie 20629	Erie 20626	Erie 20627	Erie 20683	Erie 20553	Erie 20580
NAME OF WELL		Algis Norvasia #1	Thaddeus Ochs #1	G. R. Orton #1	Richard Osborne #1	George Peck #1	Marion Pierce #2	Marion Pierce #3	Quality Heat Treat Corporation #1	Raymond Quereveld #1 (AE-27)	Richard Quereveld #1 (AE-35)
OPERATOR		Algis Norvasia	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Quality Heat Treat Corporation	Appalachian Energy, Inc	Appalachian Energy, Inc
TOWNSHIP		North East	Harborcreek	North East	North East	North East	Greenfield	Greenfield	City of Erie	Wayne	Wayne
QUADRANGLE & MAP NUMBER		North East B 151 **North East	North East D 208 **Hammett	North East C 157 **North East	North East C 154 **North East	North East C 155 **North East	North East E 143 **Harborcreek	North East E 171 **Harborcreek	Erie F 139 **Erie North	Corry B 33 **Corry	Corry B 35 **Corry
LATITUDE		3,925 ft. S 42°12' 30"	3,300 ft. S 42°07' 30"	6,400 ft. S 42°15' 00"	2,775 ft. S 42°12' 30"	3,575 ft. S 42°15' 00"	14,400 ft. S 42°10' 00"	13,400 ft. S 42°10' 00"	12,900 ft. S 42°10' 00"	11,700 ft. S 42°00' 00"	4,600 ft. S 42°00' 00"
LONGITUDE		525 ft. W 79°50' 00"	900 ft. W 79°57' 30"	10,100 ft. W 79°47' 30"	9,300 ft. W 79°47' 30"	550 ft. W 79°47' 30"	4,900 ft. W 79°52' 30"	3,300 ft. W 79°52' 30"	1,025 ft. W 80°02' 30"	2,325 ft. W 79°37' 30"	5,590 ft. W 79°37' 30"
DATE COMPLETED		8-3-78	2-27-79	11-19-78	10-8-78	11-17-78	10-27-78	11-6-78	2-3-79	8-6-78	3-31-78
ELEVATION		904 KB	1180 KB	710 KB	910 KB	714 KB	1430 KB	1460 GR	709 DF	1590 KB	1705 GR
TULLY		*1314-	*1772-	*1132-	*1389-	*1102-	*2048-	*2092-			
ONONDAGA	LIMESTONE	1549-	1999-2194	1355-	1615-	1332-	2279-	2321-	*1463-		
	CHERT		Bois Blanc 2194-2251								
ORISKANY		Absent	Absent	Absent	Absent	Absent	Absent	Absent			
HELDERBERG		Absent	Absent	Absent	Absent	Absent	Absent	Absent			
KEYSER-BASS ISLAND		1703-	2251-2376	1592-	1858-	1569-1662	2524-2641	2575-2686			
SALINA		1852-	2376-	1697-	1978-	1662-	2641-	2686-			
GUELPH-LOCKPORT		2226-	2737-	2043-	2333-	2015-	3009-	3050-			
BLACK WATER											
CANTON		2457-2609	3002-	2303-	2594-2648	2273-2322	3273-3321	3305-3358			
	IRONDEQUOIT	2609-2657	3052-	2355-	2648-2692	2322-2358	3321-3366	3358-3404	2515-		
MEDINA		2657-2793	3076-	2398-	2692-	2358-	3386-	3404-			
WHIRLPOOL		2780-	Gas 3228-	Gas 2520-	Gas 2817-	Gas 2492-	Gas 3497-	Gas 3356-	2532- Gas 2681-	*4236- Gas 4384-	*4281- Gas 4442-
QUEENSTON		2801-	3248-	2542-	2837-	2514-	3515-	3556-	2709-	4400-	4439-
TOTAL DEPTH		2850	3321	2600	2904	2587	3567	3637	2742	4431	4559
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		600 Mcf AF 700 psi/5 days development Orchard Beach North East	1,300 Mcf AF 1,035 psi development Harborcreek pool Erie North East	782 Mcf AF 738 psi/10 days development Orchard Beach North East	551 Mcf AF 805 psi/10 days development Orchard Beach North East	302 Mcf AF 676 psi/10 days development Orchard Beach North East	302 Mcf AF 950 psi/10 days development Hornby pool North East	958 Mcf AF 855 psi/10 days development Hornby pool North East	756 Mcf AF 900 psi/10 days development Lawrence Park pool North East	1,200 Mcf AF 1,250 psi/72 hrs. extension Brokenstraw Field	650 Mcf AF 1,250 psi/72 hrs. extension Brokenstraw Field

COUNTY	permit Number	Erie 20554	Erie 20538	Erie 20616	Erie 20809	Erie 20644	Erie 20774	Erie 20699	Erie 20810	Erie 20504	Erie 20719
NAME OF WELL	Harold Raymond #1 (AE-25)	Harold Raymond #1 (AE-26)	Jack Raymond #1 (AE-46)	Marie Rickrode #1	Edward Rodencl #1	Wayne Schell #1	Albert Schultz #1	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
OPERATOR	Appalachian Energy, Inc	Appalachian Energy, Inc	Appalachian Energy, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc
TOWNSHIP	Wayne	Wayne	Wayne	North East	North East	North East	Greenfield	North East	Greenfield	North East	Harborcreek
QUADRANGLE & MAP NUMBER	Corry B. 34 **Columbus	Corry B. 36 **Columbus	Corry B. 39 **Columbus	North East B 209 **North East	North East C 160 **North East	North East E 219 **Wattsburg	North East B 182 **Harborcreek	North East F 215 **Wattsburg	North East B 136 **Harborcreek	North East B 136 **Harborcreek	North East A 190 **Harborcreek
LATITUDE	4,800 ft. S 42°00'00"	9,290 ft. S 42°00'00"	6,730 ft. S 42°00'00"	7,400 ft. S 42°12'30"	4,900 ft. S 42°15'00"	250 ft. S 42°07'30"	12,200 ft. S 42°12'30"	12,625 ft. S 42°07'30"	10,900 ft. S 42°15'00"	10,900 ft. S 42°15'00"	2,700 ft. S 42°12'30"
LONGITUDE	9,890 ft. W 79°35'00"	9,990 ft. W 79°35'00"	8,750 ft. W 79°35'00"	8,800 ft. W 79°50'00"	10,500 ft. W 79°47'30"	9,100 ft. W 79°50'00"	1,600 ft. W 79°52'30"	5,790 ft. W 79°47'30"	3,000 ft. W 79°52'30"	3,000 ft. W 79°52'30"	1,400 ft. W 79°55'00"
DATE COMPLETED	7-27-78	10-17-78	11-16-78	7-13-79	12-4-78	5-27-79	2-23-79	8-23-79	4-25-78	4-25-78	5-17-79
ELEVATION	1435 KB	1512 DF	1436 KB	879 KB	670 GR	1470 GR	924 KB	1484 KB	755 KB	755 KB	684 KB
TULLY				*1370-	*1073-	*2140-	*1434-	*2500-	*1141-	*1100-	
ONONDAGA LESTONE CHERT				1597-	1292-	2374-	1656-			1361-	1325-
ORISKANY				1835-1845	Absent	2619-2624	Absent	Absent	Absent	Absent	Absent
HELDERBERG				Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND				1845-	1532-1631	2624-	1907-2059	1567-1711	1546-1681	1567-1711	1546-1681
SALINA				1945-	1631-	2734-	2059-	1711-	1681-	1711-	1681-
GUELPH-LOCKPORT				2300-	1979-	3100-	2362-	2061-	2000-	2061-	2000-
BLACK WATER				2556-2679	2242-2290	3364-3410	2618-2673	2325-2364	2284-2330	2325-2364	2284-2330
CANTON				2609-2611	2290-2339	3410-3444	2673-2699	3540-	2364-2416	2364-2416	2330-2372
MEGANA	*3996- Gas 40063-4183 4170-	*4160- Gas 40210-4308 4308-	*4050- Gas 40099-4211 4204	2661- Gas 42456-4746 2776- Gas	2339- Gas 42341-2421 2459- Gas	3444- Gas 42466-3542 3590- Gas	2698- Gas 42727-2817 2844- Gas	3590- Gas 3601-3667 3720-	2415- Gas 42520-2529 2547- Gas	2415- Gas 42520-2529 2547- Gas	2372- Gas 42375-2486 2504- Gas
WHIRLPOOL				2800-	2481-	3004-	2862-	3734-	2524-	2568-	2524-
QUEENSTON	4186-	4326-	4224-	2833	2557	3678	2944	3762	2562	2562	2562
TOTAL DEPTH	4267	4401	4307	2833	2557	3678	2944	3762	2562	2562	2562
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	1,100 Mcf AF 1,250 psi/72 hrs. new field discovery broken straw field	900 Mcf AF 1,185 psi/72 hrs. development broken straw field	825 Mcf AF 1,100 psi/72 hrs. development broken straw field	550 Mcf AF 730 psi/10 days development Burgess pool North East field	782 Mcf AF 740 psi/10 days development Orchard Beach pool North East field	212 Mcf AF 1,025 psi/10 days development Horby pool North East field	2,100 Mcf AF 850 psi/10 days development Burgess pool North East field	2,100 Mcf AF 850 psi/10 days development Burgess pool North East field	80 Mcf AF 4 bopd 820 psi/10 days development Burgess pool North East field	80 Mcf AF 4 bopd 820 psi/10 days development Burgess pool North East field	1,200 Mcf AF 950 psi development Harborcreek pool Erie field

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20709	Erie 20667	Erie 20684	Erie 20582	Erie 20668	Erie 20716	Erie 20661	Erie 20787	Erie 20682	Erie 20631
NAME OF WELL	Donald Seymour #1	J. B. Shunk #1	William Skopow #1	Anthony Slava #1 (AC-30)	John Spacht #1	Ronald G. Steele #1	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Edmond M. Timon #1	C. & C. Troyer #5
OPERATOR	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Appalachian Energy, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	C. & C. Troyer Brothers	C. & C. Troyer Brothers
TOWNSHIP	North East	Harborcreek	Greenfield	Wayne	North East	Harborcreek	Harborcreek	Harborcreek	Fairview	Waterford	Waterford
QUADRANGLE & MAP NUMBER	North East E 195 **North East	North East D 174 **Harborcreek	North East E 181 **Hammett	Corry B 41 **Corry	North East C 179 **North East	North East D 204 **Hammett	North East A 162 **Harborcreek	Union City A 34 **Waterford	Union City A 142 **Swanville	Union City A 34 **Waterford	Union City A 27 **Waterford
LATITUDE	3,500 ft. S 42°10'00"	4,200 ft. S 42°10'00"	400 ft. S 42°07'30"	8,150 ft. S 42°00'30"	7,350 ft. S 42°16'25"	4,250 ft. S 42°07'30"	13,400 ft. S 42°12'30"	12,600 ft. S 41°57'30"	350 ft. S 40°02'30"	12,600 ft. S 41°57'30"	14,600 ft. S 41°57'30"
LONGITUDE	8,400 ft. W 79°55'00"	8,600 ft. W 79°55'00"	3,800 ft. W 79°52'30"	2,530 ft. W 79°37'30"	350 ft. W 79°47'30"	150 ft. W 79°55'00"	10,150 ft. W 79°55'00"	10,800 ft. W 79°55'00"	6,700 ft. W 80°12'30"	10,800 ft. W 79°55'00"	7,825 ft. W 79°55'00"
DATE COMPLETED	5-5-79	1-4-79	2-8-79	9-18-78	1-22-79	6-4-79	12-13-78	2-14-79	7-25-79	2-14-79	11-1-78
ELEVATION	1330 KB	830 GR	1460 KB	1705 KB	634 KB	1215 KB	704 KB	1264 KB	800 GR	1264 KB	1198 KB
TALLY	*1891-	*1365-	*2088-	* 961-	* 961-	*1845-	*1181-	*2220-	*1364-	*2220-	*2196-
ONONDAGA	2114-2303 Bois Blanc 2308-2351	1592-	2321-	1190-	2062-	2321-2330	1400-	2442-	1576-	2442-	2420-
CHERT											
CHISKANY	2351-2368	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
HELDERBERG	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND	2368-2472	1836-1949	2568-2687	1430-1518	2330-2442	1649-1760	1860-2012	2686-	1860-2012	2686-	2660-2782
SALINA	2472-	1949-	2687-	1518-	2442-	1760-	2012-	2816-	2012-	2816-	2782-3312
GUELPH-LOCKPORT	2838-	2888-	3052-	1872-	2812-	2113-	2376-	3338-	2376-	3338-	3312-
BLACK WATER											
CANTON	3092-3147	2563-2618	3323-3364	2132-2182	3078-3129	2369-2422	2655-2704	3550-3653	2655-2704	3550-3653	3523-3630
IRONDEQUOIT	3147-3164	2618-2662	3364-3411	2182-2224	3129-3146	2422-2464	2704-2730	3663-3694	2704-2730	3663-3694	3630-3660
MEDINA	3164-	2662-	3411-	2224-	3146-	2464-	2730-	3694-	2730-	3694-	3660-
WHIRLPOOL	Gas 32200-3257	Gas 32668-2762	Gas 3416-3492	Gas 404383-4464	Gas 402236-2314	Gas 403176-3322	Gas 402745-2559	Gas 403690-3760	Gas 402745-2862	Gas 403690-3760	Gas 403690-3760
QUEENSTON	3338-	2810-	3556-	4470-	2367-	3324-	2613-	3859-	2903-	3859-	3837-
TOTAL DEPTH	3404	2898	3635	4575	2444	3402	2684	3928	2981	3928	3938
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	366 Mcf AF 837 psi development Burgess pool North East	95 Mcf AF 600 psi/10 days development Harborcreek pool	550 Mcf AF 950 psi/10 days development Hornby pool North East	750 Mcf AF 1,100 psi/72 hrs. development Brokenstraw field	782 Mcf AF 650 psi/10 days development Orchard Beach pool	665 psi/10 days extension Hornby pool North East	55 Mcf AF 865 psi/10 days extension Hornby pool North East	518 Mcf AF 725 psi/10 days development Harborcreek pool	500 Mcf AF 820 psi/10 days development Fairview pool Erie field	1,600 Mcf AF 1,100 psi/4 days development Waterford pool Erie field	2,500 Mcf AF 1,180 psi/4 days development Waterford pool Erie field

COUNTY	Permit Number	Erie	20665	Erie	20664	Erie	20670	Erie	20653	Erie	20680	Erie	20543	Erie	20563	Erie	20643	Erie	20593
NAME OF WELL	G., S. & J. Troyer #2	H. & M. Troyer #1	C. & C. Troyer Brothers	C. & C. Troyer Brothers	H. & M. Troyer #3	Seth Tuttle #1	Seth Tuttle #2	Seth Tuttle #3	Charles Valone #4	Charles Valone #5	Charles L. Valone	Charles L. Valone	Charles L. Valone	Charles L. Valone	Charles L. Valone	Charles L. Valone	Charles Valone #5-R	Josephine Walter #1	
OPERATOR	C. & C. Troyer Brothers	C. & C. Troyer Brothers	C. & C. Troyer Brothers	Union	C. & C. Troyer Brothers	Envirogas, Inc	Envirogas, Inc	Harborcreek	Harborcreek	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	Envirogas, Inc	
TOWNSHIP	Union	Union	Union	Union	Union	Harborcreek	Harborcreek	North East	North East	North East	North East	North East	North East	North East	North East	North East	North East	Greenfield	
QUADRANGLE & MAP NUMBER	Union City E 32 **Union City	Union City E 31 **Union City	Union City E 33 **Union City	Union City E 33 **Union City	Union City E 33 **Union City	North East O 173 **Hammett	North East O 180 **Hammett	North East C 146 **Hammett	North East C 147 **North East	North East B 135 **North East	North East B 148 **North East	North East C 147 **North East	North East C 146 **Hammett	North East C 147 **North East	North East B 135 **North East	North East B 148 **North East	North East C 147 **North East	North East E 159 **Wattsburg	
LATITUDE	12,350 ft. S 41°55'00"	12,600 ft. S 41°55'00"	11,100 ft. S 41°55'00"	4,400 ft. S 42°07'30"	4,400 ft. S 42°07'30"	5,150 ft. S 42°07'30"	5,150 ft. S 42°07'30"	3,280 ft. S 42°15'00"	4,250 ft. S 42°15'00"	2,450 ft. S 42°12'30"	2,750 ft. S 42°12'30"	2,450 ft. S 42°12'30"	3,280 ft. S 42°15'00"	4,250 ft. S 42°15'00"	2,450 ft. S 42°12'30"	2,750 ft. S 42°12'30"	2,300 ft. S 42°07'30"	2,300 ft. S 42°07'30"	
LONGITUDE	6,100 ft. W 79°50'00"	3,200 ft. W 79°50'00"	4,500 ft. W 79°50'00"	2,150 ft. W 79°57'30"	2,150 ft. W 79°57'30"	900 ft. W 79°57'30"	900 ft. W 79°57'30"	10,350 ft. W 79°47'30"	8,550 ft. W 79°47'30"	9,150 ft. W 79°50'00"	9,350 ft. W 79°50'00"	9,150 ft. W 79°50'00"	10,350 ft. W 79°47'30"	8,550 ft. W 79°47'30"	9,150 ft. W 79°50'00"	9,350 ft. W 79°50'00"	9,850 ft. W 79°50'00"	9,850 ft. W 79°50'00"	
DATE COMPLETED	1-20-79	1-13-79	1-5-79	12-15-78	12-15-78	1-22-79	1-22-79	6-24-78	7-3-78	7-19-78	7-19-78	7-19-78	6-24-78	7-3-78	7-19-78	7-19-78	11-17-78	11-17-78	
ELEVATION	1389 KB	1419 KB	1359 KB	1250 KB	1250 KB	1280 GR	1280 GR	603 KB	668 KB	668 KB	799 KB	799 KB	603 KB	668 KB	799 KB	799 KB	1480 KB	1480 KB	
TULLY	*2647-	*2690-	*2618-	*1863-	*1863-	*1882-	*1882-	*1040-	*1141-	*1141-	1318-	1318-	*1040-	*1141-	1318-	1245-	2158-	2158-	
ONONDAGA	2886-	2934-	2854-	2090-	2090-	2110-	2110-	1250-	1346-	1346-	1600-1735 Lost Hole	1600-1735 Lost Hole	1250-	1346-	1600-1735 Lost Hole	1488-	2386-	2386-	
CHERT																			
CRISKANY	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	
HELOERBERG	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	
KEYSER-BASS ISLAND	3104-	3145-	3078-	3078-	3078-	2341-2468	2340-2488	1441-1611	1523-1674	1441-1611	1650-	1650-	1441-1611	1523-1674	1650-	1650-	2628-2742	2628-2742	
SALINA	3205-	3248-	3179-	3179-	3179-	2468-	2488-	1611-	1674-	1611-	1782-	1782-	1611-	1674-	1782-	1782-	2742-	2742-	
GUELPH-LOCKPORT	3740-	3780-	3710-	3710-	3710-	2830-	2851-	1965-	2032-	1965-	2215-	2215-	1965-	2032-	2215-	2215-	3112-	3112-	
BLACK WATER																			
C. INTON	3962-4066	4010-4112	3919-4038	3096-3119	3096-3119	3117-3148	3117-3148	2180-2215	2245-2348	2180-2215	2407-2503	2407-2503	2180-2215	2245-2348	2407-2503	2407-2503	3356-3422	3356-3422	
IRONDEQUOIT	4066-4096	4112-4132	4038-4066	3149-3173	3149-3173	3148-3218	3148-3218	2215-2240	2348-2389	3149-3173	2503-2548	2503-2548	2215-2240	2348-2389	2503-2548	2503-2548	3422-3456	3422-3456	
MEDINA	4096-	4132-	4066-	3193-	3193-	3218-	3218-	2240-	2389-	3193-	2548-	2548-	2240-	2389-	2548-	2548-	3456-	3456-	
WHIRLPOOL	Gas 04157-4185	Gas 04198-4232	Gas 04119-4167	Gas 03196-1289	Gas 03196-1289	Gas 03196-3309	Gas 03196-3309	Gas 02267-2387	Gas 02267-2545	Gas 02267-2387	Gas 02267-2699	Gas 02267-2699	Gas 02267-2387	Gas 02267-2545	Gas 02267-2699	Gas 02267-2699	Gas 02267-3559	Gas 02267-3559	
QUEENSTON	4264-	4284-	4232-	4232-	4232-	3345-	3363-	2402-	2558-	3345-	2692-	2692-	2402-	2558-	2692-	2692-	3615-	3615-	
TOTAL DEPTH	4348	4324	4320	4320	4320	3409	3452	2538	2620	1735	2736	2736	2538	2620	1735	2736	3711	3711	
DEEPEST FORMATION REACHED	Queenston	Whirlpool	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	2,200 Mcf AF 1,210 psi/4 days development new Ireland field	1,100 Mcf AF 1,110 psi/6 days development new Ireland field	1,450 Mcf AF 1,140 psi/4 days extension new Ireland field	1,100 Mcf AF 598 psi/10 days development Harborcreek field	1,100 Mcf AF 598 psi/10 days development Harborcreek field	1,890 Mcf AF 1,845 psi/4 days development Harborcreek field	1,890 Mcf AF 1,845 psi/4 days development Harborcreek field	784 Mcf AF 760 psi/72 hrs. development Orchard Beach pool	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	1,970 Mcf AF 817 psi/10 hrs. development Burgess pool North East field	1,970 Mcf AF 817 psi/10 hrs. development Burgess pool North East field	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	1,694 Mcf AF 770 psi/72 hrs. development Orchard Beach pool	782 Mcf AF 870 psi/10 days extension Hornby pool North East field		

Figure 33. (Continued)

COUNTY	Permit Number	Erie 20763	Erie 20648	Erie 20573	Erie 20608	Erie 20560	Erie 20651	Forest 22185	Forest 22182	Indiana 24710	Indiana 24319
NAME OF WELL		W. W. Waterhouse #1	Rodney Watrous #1 (AE-50)	Dale Willatts #1	K. & S. Wise #3	Kenneth Vost #2	Kenneth Vost #2-A	Lot 5200 QJV-0001	Lot 5202 DJV-0201	Marlin L. Laney #1	Joseph Vehovic #1
OPERATOR		Oran and Associates, Inc	Appalachian Energy, Inc	Envirogas, Inc	N.E.A. Cross Company	Envirogas, Inc	Envirogas, Inc	John A. Vertullo	John A. Vertullo	Felmont Oil Corporation	Felmont Oil Corporation
TOWNSHIP		Wayne	Wayne	Harborscreek	LeBoeuf	Greenfield	Greenfield	Hickory	Hickory	Green	Pine
QUADRANGLE & MAP NUMBER		Corry 8.45 **Corry	Corry 8.42 **Corry	North East 0.152 **Harborscreek	Union City 0.26 **Waterford	North East E.138 **Hattsburg	North East E.178 **Hattsburg	Tidoute E.12 **Kelleysville	Tidoute E.13 **Kelleysville	Barnesboro E.42 **Barnesboro	Barnesboro D.41 **Strongstown
LATITUDE		3,110 ft. S 41°57'30"	7,510 ft. S 42°00'00"	15,000 ft. S 42°10'00"	3,850 ft. S 41°55'00"	2,290 ft. S 42°07'30"	2,490 ft. S 42°07'30"	14,750 ft. S 41°37'30"	9,600 ft. S 41°37'30"	3,890 ft. S 40°40'00"	12,150 ft. S 40°37'30"
LONGITUDE		10,910 ft. W 79°37'30"	5,550 ft. W 79°37'30"	10,950 ft. W 79°55'00"	5,860 ft. W 79°55'00"	4,900 ft. W 79°50'00"	4,870 ft. W 79°50'00"	2,000 ft. W 79°20'00"	11,350 ft. W 79°20'00"	2,210 ft. W 78°50'00"	1,150 ft. W 78°55'00"
DATE COMPLETED		6-29-79	12-18-78	11-4-78	9-18-78	8-4-78	12-6-78	9-14-78	9-2-78	3-13-79	3-3-79
ELEVATION		1480 OF	1596 KB	1070 KB	1188 KB	1514 KB	1505 KB	1295 GR	1200 GR	1917 GR	1872 KB
TULLY				*1661-	*2257-	*2198-	*2200-	3998-	3856-	*7234-	*7258-
ONONDAGA LIMESTONE				1890-	2484-	2423-	2430-	4312-	4128-	7972- Gas 88953-8078	8030- Gas 88953-8078
CHERT										7983-	8046-
ORISKANY				Absent	Absent	Absent	Absent	4364-	4200-	8073- Gas 88075-8085	8150- Gas 88152-8159
HELDERBERG				Absent	Absent	Absent	Absent	4380-	4217-	8170?	8180-
KEYSER-BASS ISLAND				2126-2261	2721-2839	2626-2784	2683-2785				
SALINA				2261-	2839-3338	2784-	2785-				
GUELPH-LOCKPORT BLACK WATER				2622-	3338-	3153-	3154-				
CLINTON				2862-	3558-3673	3421-3462	3421-3463				
IRONDEQUOIT				2933-	3673-3703	3462-3508	3463-3496				
MEDINA WHIRLPOOL				2879- Gas 82590-3077	3703- Gas 83757-3790	3508-	3406- Gas 83527-3508				
QUEENSTON				3111- Gas	3870- Gas	3600-	3640- Gas				
				3127-	3879-	3659-	3660-				
TOTAL DEPTH		4347	4400	3202	3928	3743	3734	4401	4245	8185	8252
DEEPEST FORMATION REACHED		Queenston	Medina	Queenston	Queenston	Queenston	Queenston	Holderberg	Holderberg	Holderberg?	Holderberg
RESULT		610 Mcf AF 1,000 psi/72 hrs. Spencer Creek pool	Pipe twisted off. 745 psi/10 days development abandoned. Brokenstrat field	24 Mcf AF 745 psi/10 days development Harborscreek Erie field	27 Mcf AF 1,140 psi/6 days development Waterford Erie field	Lost tools, junked and abandoned extension Harborscreek North East field	16 Mcf F 645 psi/10 days development Harborscreek North East field	Ory and abandoned New field wildcat	Dry and abandoned new field wildcat	565 Mcf AF 2,350 psi/63 hrs. Pinecon pool Strongstown field	1,500 Mcf AF 3,180 psi/3 days development Pinecon pool Strongstown field

COUNTY	Permit Number	Mercer 20181	Mercer 20185	Potter 20556	Potter 20555	Somerset 20072	Somerset 20073	Somerset 20078	Somerset 20070	Somerset 20075	Somerset 20077
NAME OF WELL		Oriviere Unit #1	Rose Kocis #1	Marvin Linderman #2	PA Dept. F & W Tract #15	Orie S. Barron #1	Edward Kirk Gas Unit #1	Latush Gas Unit #1	Earl R. Haugle Gas Unit #1	State Forest & Park Lands #924-1	Richard Sonavec Gas Unit #1
OPERATOR		Cyclops Corporation	Cyclops Corporation	Consolidated Gas Supply Corporation	Consolidated Gas Supply Corporation	Amoco Production/UGI Corporation	Amoco Production/UGI Corporation	Amoco Production Company	Amoco Production/UGI Corporation	Louden Properties Company	Amoco Production/UGI Corporation
TOWNSHIP		South Pymatuning	South Pymatuning	Stewardson	Stewardson	Jefferson	Stoneycreek	Milford	Shade	Middlecreek	Somerset
QUADRANGLE & MAP NUMBER		Shenango G 15 **Sharpsville	Kinsman I 29 **Orangeville	Renovo West C 233 **Tamarack	Renovo West C 232 **Tamarack	Somerset G 37 **Bakersville	Windber H 11 **Stoytown	Weyersdale B 11 **Rockwood	Windber B 10 **Hooversville	Donegal I 36 **Seven Springs	Somerset H 38 **Bakersville
LATITUDE		6,450 ft. S 41°17'30"	5,450 ft. S 41°17'30"	4,900 ft. S 41°30'00"	6,725 ft. S 41°30'00"	10,800 ft. S 42°02'30"	4,125 ft. S 40°05'00"	1,750 ft. S 39°57'30"	14,950 ft. S 40°12'30"	13,750 ft. S 40°02'30"	14,100 ft. S 40°02'30"
LONGITUDE		9,600 ft. W 80°27'30"	3,050 ft. W 80°30'00"	2,610 ft. W 77°45'00"	5,850 ft. W 77°45'00"	6,225 ft. W 79°10'00"	9,640 ft. W 78°52'30"	2,400 ft. W 79°07'30"	450 ft. W 78°52'30"	4,550 ft. W 79°17'30"	650 ft. W 79°07'30"
DATE COMPLETED		9-7-79	8-25-79	5-17-79	6-1-79	1-14-79	2-22-79	7-8-79	11-26-78	9-29-79	4-15-79
ELEVATION		913 K8	1138 K8	1758 GR	1692 CR	2158 K8	2235 K8	2095 K8	2242 K8	2645 K8	2044 K8
TULLY				5572-	5308-	*7774-	*7438-	*7813-	*7876-	*7525- Marcellus 8020- SG @7729,7750, 7830	*7812-
ONONDAGA	LIMESTONE CHERT	3042-	3238-	6422-	6108-	8529-	8473-	8687-	8804-		8710-
						8548-	8500-	8708-	8834-		8740-
ORISKANY		3239-3261	3440-	6438-	6121-	8666- Gas @8634-8759	8570- Gas @8634-8764	8817-	8920- Gas @8920-8936		9018- Gas @9023-9208
HELDERBERG			3460-		6146-	8780-	8767-	8960-	9030-		9298-
KEYSER-BASS ISLAND SALINA		3578-	3616-								
GUELPH-LOCKPORT BLACK WATER			4466-								
CLINTON			4774-								
			4825-								
MEDINA		4638-	4825-								
		4712-	4998-								
WHIRLPOOL		Gas @4786-4822 4904-	Gas @4968-5007 5090-								
QUEENSTON		4918-	5102-								
TOTAL DEPTH		4976	5142	5545-	6240	8852	8803	9024	9100	8148	9373
DEEPEST FORMATION REACHED		Queenston	Queenston	Oriskany	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Marcellus	Helderberg
RESULT		1,700 Mcf AF 1,550 psi/15 days development Sharon deep pool Sharon field	1,600 Mcf AF 1,500 psi/15 days development Sharon deep pool Sharon field	Storage observation well Leidy storage Leidy field	52,900 Mcf AF 3,280 psi/24 hrs. Gas storage Leidy storage pool Leidy field	1,500 Mcf AF 2,000 Mcf AF 4,215 psi/3 days new field wildcat Bakersville field	900 Mcf AF 1,500 Mcf AF 3,984 psi/10 hrs. development Shanksville field	Dry development temporarily abandoned Somerset West field	700 Mcf AF 1,500 Mcf AF 4,320 psi/2 days development Shade Creek field	Plugged and abandoned Seven Springs field	500 Mcf AF 1,400 Mcf AF 3,250 psi/24 hrs extension Somerset West field

Figure 33. (Continued)

COUNTY	Permit Number	Somerset 20080	Somerset 20081	Tioga 20074	Venango 25522	Venango 25224	Warren 27425	Washington 21147		
NAME OF WELL	John O. Weaver Gas Unit #1	Helen Wolf Gas Unit #1		Marion B. Payne #1	McCaslin #1	Tasa Corporation #1	Warren Bartsch #1	Edgar Calvert #1		
OPERATOR	Amoco Production/UGI Corporation	Amoco Production/UGI Corporation		Columbia Gas Transmission Corp.	Quaker State Oil Refining Corp.	Peoples Natural Gas Company	Red Leaf Oil, Ltd.	Pennzoil Company		
TOWNSHIP	Black	Millford		Brookfield	Allegheny	Irwin	Sugargrove	East Finley		
QUADRANGLE & MAP NUMBER	Myersdale B 9 **Hurdock	Myersdale A 10 **Rockwood		Gaines C 118 **Potter Brook	Titusville I 4 **Pleasantville	Hilliards A 8 **Barkeyville	Youngsville B 7 **Sugar Grove	Claysville H 3 **Prosperity		
LATITUDE	8,775 ft. S 39°37'30"	13,200 ft. S 39°57'30"		5,500 ft. S 42°00'00"	13,000 ft. S 41°35'03"	9,100 ft. S 41°15'00"	6,100 ft. S 42°00'00"	1,600 ft. S 40°05'00"		
LONGITUDE	7,500 ft. W 79°05'00"	1,275 ft. W 79°10'00"		1,200 ft. W 77°30'00"	3,200 ft. W 76°32'30"	8,450 ft. W 79°35'00"	7,850 ft. W 79°20'00"	4,800 ft. W 80°20'00"		
DATE COMPLETED	5-10-79	5-28-79		10-15-77	3-20-78	10-29-77	9-26-79	9-20-78		
ELEVATION	2139 KB	2084 KB		1603 GR	1494 KB	1434 KB	1421 KB	1281 KB		
TULLY	*7838-	*7624-		*4184-	*4042-	*4372-	*2862-	*6850-		
ONONDAGA LIMESTONE	8723-	8428-		4980-	4321-		3152-	7095-		
CHERT	8744-	8444-								
ORISKANY	8847- Gas @ 8850-8954	8558- Gas @ 8606-8644		5007-		4599-		7324-		
HELDERBERG	9032-	8733-		5028-		4720-		7416-		
KEYSER-BASS ISLAND SALINA						4794-				
GUELPH-LOCKPORT BLACK WATER						4904-				
						5784-				
CLINTON IRONDEQUOIT										
						5770-				
MEDINA WHIRLPOOL						5834- Gas @ 5852-5973				
						5966-				
QUEENSTON						5974-				
TOTAL DEPTH	9050	8791		5150	6061	6694	4635	7480		
DEEPEST FORMATION REACHED	Helderberg	Helderberg		Helderberg	Queenston	Queenston	Queenston	Helderberg		
RESULT	510 Mcf Nat. 2,500 Mcf AF 3,450 psi/36 hrs. New field discovery Shamrock field	100 Mcf Nat. 1,550 Mcf AF 3,400 psi/36 hrs. New field discovery Rockwood field		Plugged and abandoned New field wilddcat	389 Mcf AF 800 psi/48 hrs. Deeper pool test Pithole-Cashup field Plugged and abandoned	75 Mcf AF 1,170 psi/8 days extension Irwin pool Wesley field	50 Mcf Nat. 1,100 Mcf AF 1,800 psi New field discovery Stillwater field	58 Mcf AF 455 psi/5 hrs. Deeper pool test Pleasant Grove field producing shallow P8 to 3,000 feet		